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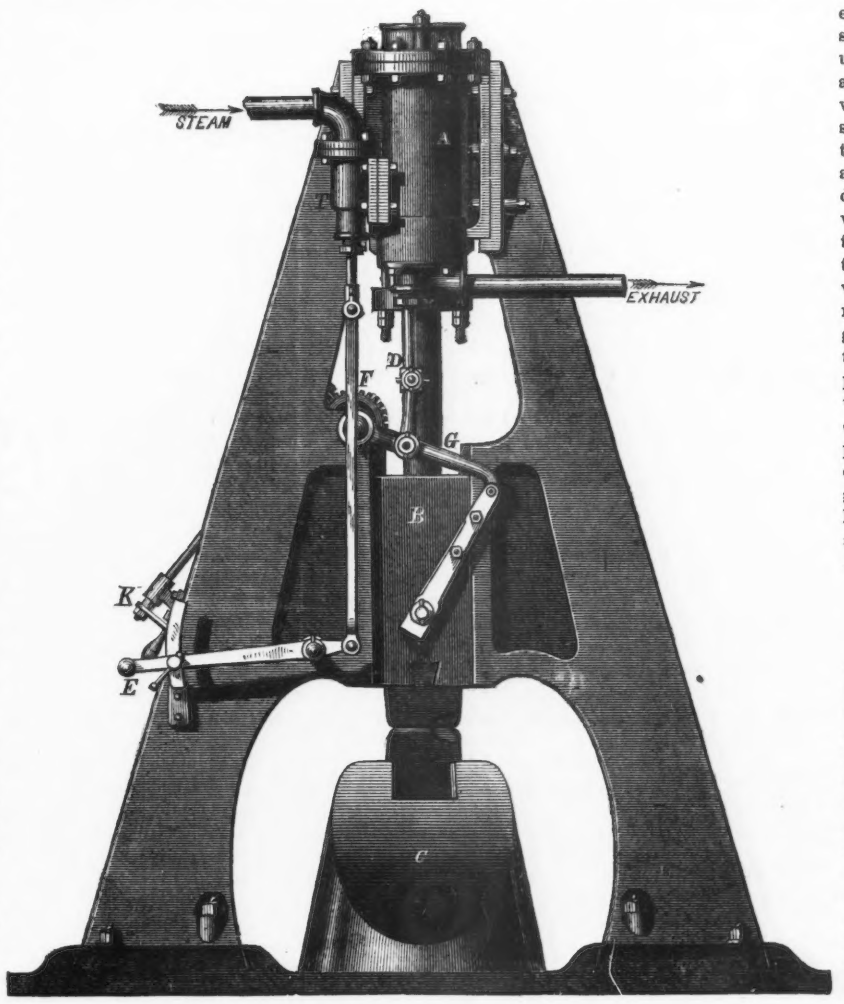
Sweet & Co.'s Steel Works at Syracuse.

THESE works were commenced on their present site in 1860, and consist of two large, handsomely ornamented brick buildings, extending 130 feet on Wyoming street and 350 feet on Otisco street, and covering about 1½ acres of ground, the motive power being supplied by a 50 H. P. horizontal engine. The works, which were built under Mr. SWEET'S immediate superintendence, are constructed with due regard to the important requirements of light and ventilation; and the constant cleanliness and order preserved among both workmen and tools is proof that the mind which was competent to lay out the original plan is also fully able to control and administer its daily operation. The chief article of manufacture at present is the patent steam-hammer of W. A. SWEET, an illustration of which accompanies this description.

The form of the frame is claimed by its builder to be the best possible shape for the objects to be accomplished, namely, firmness of support, and resistance to the blows of the hammer upon the anvil. The frame is cast in two parts, with flanges at the upper end to clasp the cylinder, A, and with guides to control the hammer head, B. The base of the frame is mounted in the usual manner upon a bed plate which surrounds the anvil block, C, and is capable of adjustment by keys in the brackets, as shown upon the bed plate. The anvil block is formed with flanges at the bottom, which extend downwards and at right angles to each other, in such a manner as to receive the ends of four large timbers, which are arranged in a pit and in the form of a pyramid. These timbers are firmly fastened together by cross bolts, and the pit is filled in firmly with sand and gravel stamped. This is one of the best foundations for such anvils, as has been proved by the experience of several years.

The construction of the valves and valve gear, however, constitutes the prominent novelties and features of usefulness in this hammer, and their combination and arrangement are such that the blows are completely under the control of the operator, being instantly varied in length and intensity, or fixed to work at any point within the range of the length of the cylinder. The ports are also constructed so that the action of the steam upon the valves and upon the piston prevents them from wearing away their seats and cylinders more on one side than the other.

This will be easily understood by referring to the shape of the valves, which are simply cylinders working inside of chambers on the front side of the main cylinder, A, the centre of which is in line with the valve stem at D. Openings are formed in this inner cylinder to communicate with the cylinder of the throttle at T, and all of these openings for the ports are made in the extreme ends of the cylinders, so that the steam enters completely around the valves as they pass their seats.



SWEET'S STEAM-HAMMER.

The throttle is operated by the lever, E, and connecting rod, F, and when the proper quantity of steam is admitted, the valve is fastened by the set screw at E.

The steam valves receive motion from the connecting rod at D, and lever, G, one end of which lever is pivoted upon an eccentric shaft which receives motion by a worm gear at F, and which is operated by a crank at K, in close proximity to the throttle lever.

The other end of lever, G, is connected with the hammer head by a light bar of wood, which travels up and down with the strokes of the piston.

Motion being thus communicated to the valve stem, it is evident that by a change of the eccentric a change of the valves is easily produced, consequently the stroke of the piston may be quickly varied by simply operating the crank at K.

The piston and piston rod are forged in one piece, and the packing rings are of the simplest form, but by following the same principle of having the openings completely around the cylinder, there is so great a freedom to the exhaust that each distinct motion of the piston is clearly indicated by the escape steam, as in an engine with the most approved cut-off.

As to the efficient working of such hammers, the manufacturer states that one with a cylinder of 8¼ inches diameter, and a hammer of 400 pounds weight, will reduce a 3-inch ingot of steel in the same time that a Sheffield "Davy Bros." hammer of 9-inch cylinder and 600 pounds weight would do the work. A great economy of steam is also claimed for this hammer. Connected with the works are a Rolling Mill, a Spring Factory, a Machine Shop, and a Foundry, together with the necessary adjuncts of an establishment of this kind and magnitude, such as handsome offices, drafting-room, engine-room, etc. The number of workmen and employees is from 80 to 100.

Mr. SWEET is also the patentee of a process for utilizing the croppings of Bessemer steel rails, which is at once novel, interesting, and highly valuable. According to this process, the rail is split into three parts, the head, the flange, and the web, which are afterwards used for different purposes, as their various shapes may indicate. Messrs. W. A. SWEET & Co. use the web for seat springs, the flange for cutter-shoes and tires, and the head for crow-bars and heavy tires.

MESSRS. WILLIAM A. SWEET & Co., having purchased the Steel Works formerly owned by SWEET, BARNUM & Co., at Syracuse, N. Y., are now selling crow-bars, with the stamp, "SWEET, cast steel, warranted;" also, SWEET'S Oil Tempered Black Seat Springs; also, Fire Steel, Toe-calk Steel, Bob and Cutter Shoes, etc., etc.

The Labuan Coal Mines.

THE Oriental Coal Company (Limited), into whose hands the extensive coal mines in the island of Labuan have passed, are now working them successfully. In anticipation of a great increase in the demand for coal in the China seas on the opening of the Suez Canal, it has been decided to supply coal at the fine harbor of Victoria, which admits and shelters vessels of the largest size at all times of the tides, and at all seasons, instead of at Coal Point, as at present, where steamers can take in coal only in comparatively fine weather. The distance from the mines to Victoria harbor, where the Governor's residence and all the public buildings are situate, is about nine miles, and the coal is to be transported by means of the patent road steamers, with india-rubber tires, of Mr. R. W. Thomson, C. E., of Edinburgh. Two of these powerful engines and sixteen wagons, to carry six tons each, are already completed, and will be shipped direct to Labuan in the company's new screw collier the "William Millar." These road steamers appear to be exciting great interest all over the world. The government of India have just ordered to be dispatched overland the first engine for a regular service which they intend establishing on the Grand Trunk Road, for the transport of troops, government stores, and general merchandize, in lieu of the miserably slow and costly bullock-trains which now creep along that fine road. The road steamers will, it is said, run five or six miles per hour at far less cost than the bullock hackeries, which cannot keep up a third of that speed.—*London Paper.*

Apparatus for Separating Gold.

DANIEL F. HAWKES, of Timbuctoo, Yuba County, California, has recently invented an improved apparatus for separating gold from the sand and gravel, in the process of cleaning up flumes in hydraulic claims, tailings, etc., and which can be employed at any place where the pan is ordinarily used. It consists of a square box or tank, having a vertical sliding gate which moves up and down across its centre, dividing the tank, when down, into two sections. The tank is charged with quicksilver to a convenient depth, and the gate placed so that the lower edge penetrates below the quicksilver surface. The water and tailings or dirt to be washed are received into this tank on one side of the gate, and pass down under the gate through the body of quicksilver, being freed in the passage of all gold, amalgam, and quicksilver, while the water, sand, and gravel are discharged on the opposite side at a lower point than where it enters. It is a well-devised apparatus for saving both time and gold. Mr. Hawkes is a practical miner, and has made other improvements worthy the attention of miners.—*San Francisco Mining Press.*

The Proposed Canal Through Astoria.

THE proposition to relieve Hell Gate by cutting a canal through Astoria, which has been suggested by various parties at different times, has been taken up by the late engineer of the Pacific Mail Steamship Company, Mr. VANDERBILT. He has matured a plan by which such a canal could be constructed for less money and in less time than would be required for the removal of the rocks in Hell Gate channel. The canal would be 2,000 feet in length, 600 in breadth, and 34 in depth. Through this cut vessels of all sizes could pass uninterruptedly night and day. The estimated cost of its construction is $3,000,000. This plan appears feasible, and is approved by several engineers and pilots.

But while such a canal might greatly facilitate navigation in that quarter, Government engineers believe that Hell Gate would still have to be cleared out. When the rocks are once removed from that channel, a great dock system can be created along the extended shore line on both sides of the river, which the canal would afford no room for. This wharf line would become of immense value, wholly compensating for the cost of removing the rocks. In addition, the first estimates of the sum needed for Hell Gate have been found to be greatly exaggerated, and it is now believed that the channel could be thoroughly cleared for the same sum that the building of the canal would require.—*New York Times.*

Another Colliery Explosion in England.

THE London *Daily News* says: "On Friday, October 22, information reached Frome that an explosion of fire-damp had taken place in one of the Newbury pits. The pit is called the Macintosh, and had only recently been put in working order, though it had been opened five years ago. It is one of two worked at Newbury by the Westbury Iron Company (limited), the down-shaft being at Newbury pit, and the up-shaft at the Macintosh. The depth of the latter pit is one hundred and twenty fathoms, and the average seam of coal five feet six inches. The system of working pursued is the eight-hours' shift, and at six o'clock the night men had come up and the day men were going down. At half-past six, thirteen men and boys had been let down, and the remainder were ready to follow. The lamps were duly delivered by the lampman, all

being locked. In a few seconds after the last batch had gone down, a loud, rumbling noise, followed by a shock, as of an earthquake, was heard, and those above ground were at once aware that an explosion had taken place. Very naturally, there was great excitement, but prompt steps were taken to ascertain the extent of the disaster, and, if possible, to rescue the unfortunate persons. The bailiff, Mr. Baker, descended the Newbury pit, and on entering the main level, be found that the door which separated the pit had been destroyed, but he was enabled to secure the fragments, and by this means to restore the ventilation to the Macintosh pit—the draft, it should be understood, being supplied by an engine into the latter pit, while the outlet was at Newbury. As soon as practicable, there were plenty of willing volunteers to descend the pit in search of their unfortunate comrades. It was some time before any tidings reached the bank, and as the shock had been felt for fully half a mile around, a great crowd had assembled, and a most agonizing scene ensued. The pit gave employment to fifty-five persons, and wives and children, and mothers and fathers, tearfully awaited the result. When at length the first body came up, the anguish of the scene was, if possible, increased. A human form remained, and that was about all. The features were scorched so as to be almost unrecognizable, and the clothes were burnt or torn apart. Thus, hour after hour, the sad work went on, despair and hope alternating as the cage brought up its living or mangled or dead freight. The colliers of some of the other pits in the district had by some means become aware of the calamity, and at once struck work to become spectators of the mournful scene transpiring at Macintosh. It was a quarter past one o'clock when the last of the unfortunates was brought up. In the meanwhile, almost the entire medical staff of the district had assembled, and the injured men were carefully tended and removed to their homes, where two of them died, and we regret to hear that only one is likely to survive. The scene in the pit must have been most appalling. The dead and wounded had been blown up and down the pit, and two had gone into a pool of water, whence they were fished up by a crook."

The Roads of New York Central Park.

BY WILLIAM H. GRANT, SUPERINTENDING ENGINEER.

IX.

THE character of the gravel road, constructed as has been described, as to effective service when brought into use, remains to be spoken of. The following brief extracts from the annual reports are given, as presenting the progressive evidence that was developed from year to year upon this subject:

* "The surface of the gravel road finished with this intermixture (detritis and scrapings from broken stone heaps) has retained its firmness, under constant use, during several months."

† "As between gravel roads and MacAdam roads (and Telford roads as well) the experience of two to three years in the use of the two kinds upon the Park, seems to have settled that the former are preferable for Park travel. Besides being less expensive in construction, the gravel roads are, so far as present experience indicates, less difficult and less expensive in maintenance, the surface longer retaining moisture in summer, and consequently requiring less attention in watering, and raising less dust than MacAdam roads. They are also more agreeable to travel on, both for carriages and horses, the difference being at once perceived in the greater ease of motion and less noise from the wheels and hoofs, in passing from the MacAdam to the gravel road. The traction, which is usually rated higher upon gravel roads, is scarcely an appreciable element upon the easy grades of the Park roads.

"No plan of road, it is believed, is better adapted to park purposes, all things considered—cost, facilities of construction and maintenance—than the gravel road, constructed in the best manner, with the best materials.

"The portions of road of this kind constructed in 1860 (upon paved bottom) with screened gravel used in forming the last layer of the surface, have clearly surpassed, in all the more desirable characteristics, all other kinds of road that have been tried upon the Park. * * * These portions of road have withstood, under constant, though not heavy travel, the heats of two summsrs, and the frosts, thaws and melting snows, (the latter very trying to road surfaces) of one winter, without injury, with scarcely appreciable wear or loosening of surface or dust, and with but little attention to watering, and no repairs, being at all times smooth, firm and even, and very agreeable to travel on."

Again: ‡ "The sample of road of eight hundred feet in length, finished with screened gravel, which was described in the last report, is also worthy of further mention. The merits of this kind of road surface have become still more obvious after two years' additional use.

"The length of time, now upwards of three years, that this sample has been in constant use, has afforded a fair test of its substantial qualities, as well as of its relative advantages in point of economy.

"The additional expense of using screened gravel, in the manner described, it is believed, is well repaid in the superior wear of the material and in the saving of expenses of repairs."

To these statements may be added now the results of an additional year's observation.§ The last-mentioned piece of road of eight hundred feet in length, which is spoken of as a *sample*, because it was the first to receive a thorough finish with screened gravel, has had no renewing material added to it up to this date. It is now nearly five years since it was constructed and opened for public use, and during all that time it has required no repairs except at one point—on the shortest part of a curve, where, from the peculiar exposure consequent upon the turning of carriages, the surface of the gravel had become at times loosened and uneven, so as to require some attention. In other respects it has needed no renewing or special repairs. The roller has been occasionally passed over it after rainy weather, and it has been watered when dry, as in the case of the other kinds of road. It has been observed, however, that it needed less rolling, and is much less affected by rains and by freezing and thawing, than the other roads. The actual amount of wear has been very trifling and is quite remarkable, the surface still remaining well crowned and in nearly as true and perfect a condition as when first completed.

While other portions of the road have worn down from one to three inches *annually*, this has not worn to exceed one and a half inches in any part, during the whole time it has been in use; in other words, it would appear to be, within moderate bounds, *from two to three times as durable as the other roads.*

When this fact is taken into consideration, together with the comparative saving in the mere rolling and other expenses of maintenance (exclusive of the renewal of materials), and also the advantages derived from the possession of a superior road at all times, we have presented, in a very striking light, the merits of this kind of road. In analyzing the causes that contribute to the greater durability of a road constructed in this manner, as compared with other gravel roads in which screened gravel is not used, and also with broken stone roads, we shall develop some points upon which opposing opinions prevail.

Gravel, for instance, has been held by some road-makers, as being inherently a difficult, if not an impossible material, to make a superior road of. The rounded form of the pebbles (together, perhaps, with their too greatly polished surfaces, in some instances), has been the source of the difficulty. It has been supposed that the pressure of a wagon-wheel upon a pebble, surrounded by and lying upon, or partly between, other pebbles, must necessarily have the effect to displace, not only the one in contact with the wheel, but many others, each pebble acting somewhat as a wedge, under the weight of the wheel, to crowd away those in its vicinity. Results something like this have doubtless been observed, and it is easily understood that they must take place with gravel in its ordinary condition, especially when dry, for the pebbles, like round shot, piled on the top of each other, without any intervening substance to produce cohesion, must give way on the application of a slight pressure; but it does not follow that such results must take place under all conditions of practice.

The advocates of broken stone have also held, that the flat sides of the stones, when brought into contact and adjusted together in a mass (as MacAdam's theory supposes), must cause them to lie more firmly, and to be less liable to jostle each other out of place, than in the case of rounded pebbles. This might be true, if the contact and adjustment of the stones were of the perfect kind imagined, which practice shows is by no means the case. The results in the construction of the broken stone roads of the Park, have been previously stated in illustration of this point.

As regards any failures that may have occurred heretofore, in the construction of gravel roads, it is believed they are attributable to incompleteness of manipulation, or to inferior materials, or both, rather than to any inherent difficulty in the material itself.

The prominent points that are deduced from observation and experience in the use of broken stone, and screened gravel roads, are:

1st. That the rounded form of large pebbles (not too much polished by attrition), freed from the smaller particles and earthy matter, is peculiarly favorable to their strength to resist crushing, wear and abrasion, and to their packing and consolidation, through the intervention of the binding material; giving them, as compared with both gravel intermixed with the natural gradations of coarse and fine pebbles, etc., and angular broken stones, superior power to resist displacement. The pebbles being firmly held in place, and prevented from slipping about and grinding upon each other, no practical wear takes place, except on the surfaces actually exposed to contact with wagon-wheels.

2d. That the binding material employed, from its nature and the treatment it receives by powerful compression (the latter greatly aided by the rounded form of the pebbles), becomes in itself a firm and serviceable substance, that contributes, in no inconsiderable degree, to the perfection of the wearing surface of the road.

3d. That, added to these circumstances, the gravel (in the special case of the Park roads), is of a hard and tenacious character, being the natural product of a species of fine-ground, compact stone, that is equal, if not superior, in quality, to trap-stone, irrespective of the advantage of the rounded form.

Besides this, it must not be overlooked, that there are characteristics possessed in common by the roads of the Park, constructed respectively with screened gravel, common gravel, and broken stone, that contribute to the general successful results of the work.

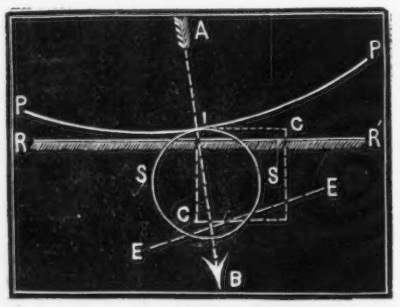
The general cleanliness and coarseness of the body of gravel *below* the top or screened layer, and the freedom with which it is drained of water penetrating from the surface, together with the thorough drainage of the sub-pavement, and of the ground below and adjacent, very much modify the disturbing and loosening action of frost, as well as of rain and sun.

For the benefit of those who attach importance to a theory, as being necessary to confirm the results and deductions of experience, it will not be difficult to show that the foregoing points may be sustained (*a posteriori*) by a theoretical investigation.

The mechanical action of wagon-wheels upon the two kinds of stone—the broken and angular, and the spherical or rounded—and upon the material associated with them, may be illustrated as follows:

First. It is well known by all who are observant of such matters, that an isolated round stone, embedded in the surface of a common road, retains its place much longer under the action of wagon-wheels than a flat or angular one, similarly situated, and also that the jolt, caused by a wheel in passing over the round stone, is usually felt more slightly than in passing over the angular one.

Let the circle S S, in the diagram below, represent a round stone (sphere) embedded in the surface of a road R R′, a portion of the top of the stone only, at I, being exposed above ground. P P represents a portion of the periphery of a wagon-wheel that is supposed to be moving in the direction R to R′. I is the point of contact of the wheel with the stone. The dotted line, A B, represents the direction of the radius of the wheel prolonged through the point of contact, etc.

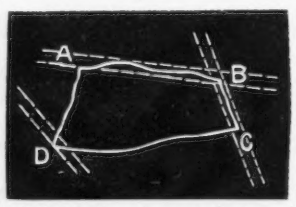


It will be seen from this, that the first impact of the wheel with the stone, at I, is with a force (in the direction of the radius) nearly perpendicular to the stone, and passing directly through its centre or axis, and that the main effect of the blow must be to settle the stone deeper in its bed rather than loosen it or cause it to rise or work upwards. If any loosening effect is imparted to the stone, it is, at least, partially remedied by the action of the wheel in passing onward, and pressing the stone, and the material in advance of it, back into their former position. The repeated action of the wheel in this manner, in alternate opposite directions, *may*, after a while, so disturb the surrounding material—the stone being supposed, from some cause, to be prevented from sinking deeper—as to permit the stone to be displaced, but this doubtless occurs, in the majority of cases, from the gradual wearing down and washing away of the surrounding material.

Next; suppose the round stone to be removed from the figure, and the angular stone (cube), C C, represented by the dotted lines, to take its place, the angular stone to be considered in this case of equal volume or solidity with the round one. It will be seen that the wheel first strikes the angular stone on one corner, the direction of the force A B being through the extremity instead of the centre of the stone, and hence the effect of the blow is, mainly, to sink the side of the stone next the wheel in its bed and tilt up the opposite side, as shown by the line E E, and, at the same time, giving the stone an impulse forward and obliquely upward. As the wheel passes over the stone and leaves it, it imparts similar disturbing forces to it, in a less degree, in the reverse direction. It soon results from this, that the bed of the stone becomes uneven, particles of dirt working down and insinuating themselves under it, and gradually rising it up bodily, the enclosing material around the sides becoming loosened, and the space enlarged, until the stone, with some succeeding blow, and it may be a very slight one, is removed entirely from its place.

The comparison of a spherical stone with a cubical one of equal volume, as in the diagram, is much more favorable to the angular form than the comparison of a sphere or spheroid with the more practical forms of angular stones that have greater flatness than cubes; for, as the depth of an angular stone becomes less in proportion to its breadth of horizontal surface, its liability to displacement greatly increases. Also, the greater the breadth of surface of a flat stone, the greater is the area presented to the action of wagon-wheels, multiplying the chances of concussion, etc. It is further to be noted, that all angular stones with flat surfaces are subject to the action of wheels in the following manner, which is not common to spherical ones:

Let A, B, C, D represent the top surface of an angular stone; then the dotted parallel lines will show that a wheel may pass over the extreme corner of the stone, as at D, or it may pass along the extreme side, as at A B or B C, exerting in either instance a very effective displacing force, that a spherical stone cannot be supposed to be liable to.



What is thus shown to be true of separate or isolated stones, is true, in a greater or less degree, of stones in the mass. If an angular or flat stone, lying in a detached position, is exposed to more numerous chances of displacement than a round one, it is also exposed when aggregated with other stones of the same kind.

In the case of isolated stones that has been considered, the surrounding material constitutes the sole medium of resistance to displacement, and when the stones are aggregated, whether round or angular, the interposing material still constitutes mainly the resisting medium, but with the difference, that it is assisted by the stones themselves, in contact or in partial contact, with each other. This condition somewhat affects the nature of the problem, but if it is true that *the*

* Report of Superintending Engineer of January 1st, 1860.
† Report of Superintending Engineer of January 1st, 1862.
‡ Report of Superintending Engineer of January 1st, 1864.
§ This part was written in 1865; the attention of engineers and others interested is specially invited to it.

spherical form of stones is more favorable than the angular form to the effective packing and compression of the surrounding material, which can scarcely be doubted, then it continues the advantage on the side of the rounded stones. Besides, it has been seen, that angular stones, as they become flattened and depart from the form of cubes, have an increased liability to displacement, and if we examine broken stones as they are prepared for use in the construction of roads, we shall find that they depart very widely and meterially from cubical forms. (This is not the usual supposition, but it is practically true.) The cubical form, even approximately, is the exception rather than the rule, the stones taking an almost infinite variety of other and less regular shapes, such as pyramids and wedges, having acute angles, triangular sides, etc., etc. The consequence is, that their tendency to cohesion, and resistance to displacement, are proportionably impaired.

It may be said, that rounded stones also depart very much from their assumed forms; but this is not practically the case to the extent that prevails with angular stones artificially produced. Cobble stones, and the coarser pebbles of gravel, although they take the forms of spheriods, more or less elongated or flattened, nevertheless retain their distinctive spherical surfaces, which govern, with a good deal of uniformity, the principles upon which they act or are acted upon.

It would seem, then, without further elaboration, that, *in theory,* no advantage can be made to appear in favor of broken or angular stones over rounded ones, in the formation of the *wearing surface* of roads; but, on the contrary, that strong reasons exist, founded on demonstrable principles, for giving the preference to the rounded or spherical forms. When this is sustained by ample experience and clear practical results, as in the case of the Park roads, there cannot much longer be any doubts remaining as to the utility and economy of using, instead of the material artificially produced, that which nature abundantly furnishes to our hands.

The condition of the screened gravel road was referred to in the subsequent Annual Report of January 1st, 1866, after the road system of the Park was completed, as follows:

"The road has been uniformly in good condition, except when temporarily obstructed by snow, for travel during all seasons, being unusually free from dust and mud. The wear that has taken place, which amounts to about one and a half inches in depth, has been remarkably even, the road retaining at the present time a regular crowning surface similar to that with which it was first constructed. The preservation of its true crowning form has doubtless been of great advantage to it. It is not practicable to compare it accurately with the broken stone roads, as these roads have mostly been covered with a considerable depth of gravel from time to time, which has changed their character, and the few spots where they have not been so treated, have been coated with gravel, to smooth over the asperities of the stones, to such an extent as to prevent a full test of their wear. It appears, however, from some observations that have been made, that the exposed broken stone surfaces have been worn, exclusive of the gravel that has been added, quite as much (with about the same service) as the screened gravel road, showing that the actual wear would have been somewhat more than that of the latter road if gravel had not been added."

In the construction of roads of this kind, those with the paved bottom included, no material improvement upon the plan and treatment that have been adopted can be suggested, although doubtless some improvements can be made and will be suggested in their future use.

When the gravel road was originally recommended, as the kind of road most suitable for the Park, no doubts were entertained as to its efficiency *for the mere purpose of a carriage road,* subjected to the comparatively light service of pleasure travel. The operations of the portions of the road treated with screened gravel, have been watched closely, and with much interest, with reference to its capability to withstand *heavy* or "*common use,*" and the conclusion has been arrived at, that it may be tried for such latter use with a strong probability of success.

Loaded wagons employed on the Park have frequently been driven over the road, without producing any sensible disturbance or injurious effect upon the surface, and, from all indications that are presented, *such a road will bear the heaviest traffic equally well with the MacAdam and the Telford roads.*

Superior economy and facility of construction, and a superior surface over the latter roads, are strong incentives to a thorough and conclusive experiment upon this point.

[TO BE CONTINUED.]

Steel-Headed and Steel Rails.

Mr. ABRAM S. HEWITT communicates to the New York *Tribune* some interesting facts concerning the steel-headed rails in use on the Erie Railway. Mr. HEWITT is a competent witness; and his evidence will receive the credence due to his acknowledged ability and high personal character. His letter on the subject is called forth by an elaborate article in the *Tribune,* containing much valuable information on the use of steel rails in this country and Europe, but appearing to condemn the steel-topped rails, and to censure the Erie management for adopting them. Mr. HEWITT remarks that steel-headed rails are of two kinds. First—Rails with *solid cast steel tops,* made from Bessemer, Martin, or crucible steel. Second—Rails with tops made from *welded billets* or *bars of puddled steel.* The latter might laminate, but the former could only wear out in the same manner as solid steel rails. While he has never hesitated in his preference for the solid cast steel heads as contradistinguished from the welded steel, he thinks it fair to say that the welded puddled steel heads, both in Europe and this country, are doing most excellent service, and, so far as experience goes, do not seem to be inferior to the solid steel rails. He found hat the guarantees given in Germany were usually three years for iron rails, seven years for puddled steel rails, eleven years for all steel rails. A most careful examination has just been completed of the steel-topped rails made at Trenton for the Erie Railway. At the time of the inspection, 21,786 puddled steel-topped rails had been laid, of which one hundred and seven, being half of one per cent., were found to be defective. Of 1,315 iron-topped rails made at Trenton, of the best materials, and in the same manner as the "Trenton" rails, which, on roads less heavily tired, are proverbial for durability, and in use about the same average time as the steel-topped rails, 45, or about 3 4-10 per cent. were found to be defective. But the most striking difference between the steel-topped and iron-topped rails, abundantly proven by the experience of Germany, as well as of this country, is that the failure of the steel tops, where it occurs, is *immediate,* while the failure of the iron tops is *gradual.* The wear of the two kinds of rails on the Erie Railway confirms this statement, and there cannot be a doubt that an inspection a year hence will be still more favorable to the steel tops. It is also added, by way of caution, that the iron-topped and steel-topped rails are laid promiscuously in the track, and unless the trackmen observe the marks, a false impression might easily arise in regard to the durability of the steel tops. But the most interesting fact in regard to these rails is that not a single one, whether iron or steel-topped, has broken in the track, and yet the old rails, of which they are two-thirds composed, were of very inferior quality. This shows what can be done by careful workmanship and the use of sufficient new material of the best quality, when the railway officers have the intelligence to pay for skill and quality. This experiment was undertaken by the New Jersey Steel and Iron Company, solely for the purpose of deciding the relative merits of rails with iron tops, rails with puddled steel tops, rails with cast steel tops, and solid steel rails, without any expectation of immediate profit. The rails have cost more than the price paid for them, but it is now settled that old rails can be covered with solid steel heads that will stand the traffic of the Erie Railway, that will not get loose by use, and that the work can be conducted on the line of the Erie Railway with great economy, because coal is cheap and access to suitable new material convenient. Hence he has not hesitated to advise the officers of the Erie Railway to make immediate arrangements for re-rolling their rails on the line of their road with solid cast steel heads, unless it shall be found that by some new process solid steel rails can be made at a less cost than steel-topped rails.

Careful observation of the wear of the rails on the Erie Railway, as compared with other leading lines of railway in this country and in Europe, shows that there is no track in existence subjected to such severe usage, and that nothing but steel will stand the heavy traffic, ponderous engines, and high speed of that great highway. The true mission of the Erie Railway is not yet fully understood by the public. It is essentially a *coal* road, and must convey millions of tons not only East but West, and its present tonnage is but slight compared with the future demands for transit over its tracks. Hence it is folly to lay anything but the most durable material on the road.

Mr. HEWITT points out that the conditions of the problem for making cheap steel, suitable for rails, are essentially different in America from what they are in Europe. The greater part of our ores contain phosphorus, which renders them unsuitable for the Bessemer process. But by the Siemens-Martin process, pig iron containing phosphorus can be utilized, and the resulting steel welds admirably to iron, which is not the case with other kinds of cast steel, containing the same percentage of carbon. Hence it is probable that steel-topped rails can be made more cheaply than rails all steel, except in those localities where the material is suitable for the Bessemer process. But it so happens that most of the phosphorus is mechanically combined with the oxide of iron, in our rich and abundant magnetic ores. This peculiarity has just begun to attract attention, and there is therefore reason to hope that large amounts of material, now useless for the Bessemer process, will be rendered available for it by improved methods of treatment. Again, these rich ores are admirably adapted to the so-called direct processes, by which the oxygen is expelled and the resulting sponge of metallic iron left in a condition to be converted into steel by the Siemens-Martin or the crucible process. But these direct processes, although apparently so simple and inexpensive, have hitherto baffled the science of chemists and the practical skill of metallurgists. There never was a time when success was so necessary, or when so much talent, science, capital, and energy have been devoted to the solution of this interesting problem. With the production of cheap metallic sponge will come cheaper steel, cheaper rails, and cheap but safe transportation. BESSEMER and SIEMENS are both engaged in trying to solve this great problem, each in his own way, and each devoting to the task not merely his great experience and high scientific skill, but the well-earned fruits of past inventions, by which the cost of steel has been so reduced as to be a successful rival to iron for uses the most ordinary.

The following is the circular of Mr. HEWITT to railway companies, on this subject:

"OFFICE OF COOPER, HEWITT & CO., No. 17 BURLING SLIP,
NEW YORK, Oct. 20, 1869.

"DEAR SIR: Having made a visit to Europe during the past summer, with Mr. JOHN FRITZ, Manager of the Bethlehem Iron Works at Bethlehem, Penn., for the purpose, mainly, of acquiring information in regard to the use of steel for rails, I do not think that I can render a more acceptable service to the railroad interests of the United States than by making a brief statement of the conclusion at which we arrived. *First:* It appears to be certain that on all roads doing a large business, and especially where heavy engines are run at a high speed, steel must be substituted for iron, on the wearing surface of the track. The steel may be either puddled, or made by the Siemens-Martin Bessemer, or crucible process; but whatever kind of steel may be employed, care must be taken that the steel be of good quality, and adapted to the purpose. This demands skill in the manufacture and care in the inspection. Unless this skill is used, and care exercised, there will soon be the same complaint in regard to the quality of steel as has existed in regard to the quality of iron. *Second:* For roads having a small traffic, iron rails are, as yet, more economical, provided light engines and moderate speed are employed. If proper care is used in the manufacture and inspection, and a price paid sufficient to cover the cost of good materials and workmanship, there is no more difficulty now than there was in former years in procuring iron rails of good quality. The real cause of the inferiority of modern rails appears to be due solely to the unwillingness of railroad managers to pay a price adequate to meet the actual cost of good iron and skillful work. *Third:* The question as to whether all steel rails, or iron rails with steel heads, should be used, is mainly one of first cost. There have been slight objections to steel-topped rails, when cast steel is used for the head, arising out of the liability of the steel to separate from the iron, but this objection is now removed both in Europe and in this country, by the experience which has been gained at Dowlais in Wales, and at Trenton in New Jersey; and it is safe to affirm that steel and iron can be certainly united so as not to separate in the weld. The experience with the Booth rail on the New York Central Railroad also goes to show that it is not necessary to weld the steel and the iron at all, leaving it merely a question of prime cost as to whether the heads shall be welded or not. As to all steel rails, whether made from Bessemer, Martin-Siemens, or crucible steel, the only objection appears to be in their liability to break in very cold weather; but the percentage of such accidents is very small, and, all things considered, it is difficult to decide whether this objection is of more weight than the possibility of a separation of the steel from the iron in the steel-topped rails. On the whole, we came to the conclusion that we would take either the *all-steel* or the *steel-topped* rails, properly made, giving the preference to the one which could be supplied at the lowest price per ton. In other words, we believe that the question of first cost should alone decide whether to use steel-topped rails or rails made entirely from steel, provided the quality of the materials used and the workmanship is equally good in both cases. The Siemens-Martin process has solved the only difficulty which existed in regard to steel rails when worn out, by working them over as the raw material for new rails. This process is now in operation at most of the leading works in Europe, and can be seen at work at Trenton, N. J., producing steel which welds perfectly to iron, and therefore admirably adapted for steel tops. Very respectfully, your obedient servant,

"ABRAM S. HEWITT."

We extract from the article in the *Tribune* above alluded to, the following paragraph, embracing the opinion expressed concerning steel-headed rails. The writer remarks that this year the Erie Company is not laying a single solid steel rail. It is putting down, instead, about 2,000 tons per month of iron rails re-rolled at Elmira, and about 1,200 tons per month of steel-headed rails made at Trenton, with old iron rails for the base, and a cap of puddled steel welded to this, and forming about one-third of the height of the rail. About 6,000 tons of these have been laid since last November, and very diverse opinions are expressed concerning them. A prominent official connected with the road admitted to an importer of solid steel rails in this city, that they were "giving out in all directions." On the other hand, an agent of the manufacturers, after careful inspection, found in the whole lot less than a dozen rails that showed flaws or defects of any consequence. The truth, undoubtedly, is, judging from the essential nature of the case, and from European experience, that these steel-headed rails are better than iron rails, but much inferior to rails of solid steel, and the public must judge for itself, whether the Erie Company is to be commended or justified for renewing its track with anything but solid steel rails, when the traffic on that road, as its officers are proud to say, tries the rails as severely as on any road in the world. A quantity of steel-headed rails made at Rochester, and ingeniously contrived so that the action of the wheels tends to fasten the cap more firmly to the base, have worn well for two years past on the track of the New York Central; and some enthusiasts have maintained that such rails are even better than those of solid steel, inasmuch as the hard steel cap furnishes the required wearing surface, while the tough iron base affords a surer resistance to the downward pressure of passing trains than brittle steel possibly can. This is a point still in dispute, but the general opinion of practical men is indicated clearly enough by the fact that in Germany, where all kinds of rails have been thoroughly tested, steel rails are guaranteed for twelve years and steel-headed rails only for five.

In conclusion, the *Tribune* writer says: "The great advantage of steel rails lies in their homogeneity. An iron rail, or a steel-headed rail, is made of a pile of bars heated and welded together, but a solid steel rail is rolled from a single ingot, and consequently is subject to wear only, whereas the others are exposed to 'wear and tear,' and the 'tear,' as any one must know who has ever noticed the battered, laminated, and disintegrated condition of iron rails, on a much-used track. is a most serious consideration. So great is this advantage that a single steel rail has been known to outwear no less than twenty-three iron rails placed successively in the same track, and it is perfectly safe to say that any good solid steel rail will outlast a dozen rails of iron. The argument that steel rails are worthless when once worn out, never had much force, and is now entirely upset by the discovery of the Martin process, by which old steel can be reworked with perfect ease. And the grand objection that steel is brittle, and, therefore, steel rails must

break, is now fully overthrown by actual experience. Of course steel rails may be made so brittle as to be worthless, and it is well ascertained that punching holes in them has a most injurious effect; but this process is now discontinued, and it is certain that rails rolled from good Bessemer steel, and drilled, instead of punched, are not only far more durable, but are at least as tough as the best iron rails."

Economy of Boiler-Clothing.

TO THE EDITOR—SIR: The subject of this heading does not come up without strong recommendations to the attention of all who are interested in the careful and judicious management of steam boilers. It indeed requires an effort of reason to discover why it has not been examined more closely hitherto, since it is one of such paramount importance. Incontestable evidence is almost everywhere furnished by nature of the necessity of economising heat wherever its outward transmission would be prejudicial to animal or vegetable health. Man is endowed with faculties which enable him to provide a covering for himself, which, as most of us are aware, possesses strong non-conduct-ing properties by which calorific transmission from within outwards is intercepted, and the required temperature maintained in the human body. Birds and animals which inhabit cold countries are invariably provided with the best non-conducting clothing. The former being more warm-blooded than the mammalia, they are furnished with feathers, whose interstices are filled with down, which is known to be one of the worst conductors of heat. The work of nature in this direction extends still further; trees are protected by a covering of bark, which is a better non-conducting material than the wood itself. In fine, to whatever portion of nature's wide domain we turn our attention, we see the same universal rule observed, of preventing the transmission of heat-rays from organic structures by a non-conducting sheathing of some sort.

"That alone is true philosophy," says BACON, "which repeats the words of the universe with fidelity, and is written, as it were, by dictation of the universe." If this be true, it is impossible to imagine anything more at variance with the laws of the universe, or with even common sense, than using boilers and steam pipes with their surfaces exposed to the wasting influence of the atmosphere. Yet it is no uncommon spectacle to see not only the surfaces of boilers quite uncovered, but also steam forced to get to its work from a considerable distance through pipes that seem better adapted for heating the building than feeding an engine. The circumstance will doubtless surprise the engineer of the next century, and lead him to infer that the average standard of human sagacity in this division of art was certainly not very high.

The experiments of the most skillful and reliable exponents of science in relation to heat, merit the greatest attention, and suggest many improvements in its practical management. It has been proved that there are two active agencies at work in abstracting caloric from heated surfaces. The one is known as radiation, and the other as distribution or transmission of heat by contact. It need hardly be said that these two properties are entirely different, and act independently of each other.

When heat is given off by radiation, it is progressively transmitted or propagated in straight lines which proceed in various directions round the source of its supply. For instance, when a hot body is suspended in a room, it will transmit heat-rays in every possible direction. To prove distinctly that these heat-rays act entirely independent of any atmospheric influence, a thermometer suspended in the exhausted receiver of an air pump can be at once affected by them. Though a large amount of heat is dispersed from unclothed boilers by radiation, a still greater proportion is dissipated and lost by distribution or transmission by contact with particles of surrounding atmosphere. When two bodies are in contact, they distribute between them the heat they contain in such quantities as to render their temperature equal. The constituent particles of solid bodies being incapable of changing their mutual position, heat can only pass through them slowly and gradually from particle to particle. But with a mass of air—especially air that is saturated with vapor—the peculiarities which characterize the motion of heat are widely different. In this case the rapidity of transmission is immensely increased, and, as TYNDALL observes in his lecture on heat, "the interatomic spaces are so vastly augmented, and the molecules are so completely released from all mutual entanglement, that we should be almost justified in concluding that gases and vapors furnish a perfectly open door for the passage of the calorific waves." Air, no doubt, is a good non-conductor, but only so when it is confined in a tight compartment. When a stratum of unconfined air becomes warm by contact with a heated surface, it immediately ascends and gives place to the colder and heavier strata above it, upon which a like effect is produced. Hence the particles of air nearest a heated body that is exposed to the atmosphere are continually changing their position, and a perpetual and quiet circulation of ascending and descending current is established, which imparts heat copiously and energetically to the whole surrounding mass of atmosphere. It is therefore exceedingly difficult, if not wholly impossible, to form anything like an accurate conception of the amount of heat thus expelled from a boiler's surface by the temperature surrounding it. There being a continuous descent of cold air to supply the place of the warmer and more rarefied strata that successively fly upwards, a vast amount of heat might thus pass away from a boiler, and yet no very high degree of temperature would be appreciable to any person standing near it, save that which was caused by radiation. The walls of buildings in which steam-power is used would have a tendency to reduce any high rate of temperature, especially if they were constructed of brick or stone, both these materials being good conductors. Indeed, it may be said that this property of conduction has the power, under certain circumstances, of completely neutralizing the action of heat by conveying it rapidly from its source. A good illustration of this phenomenon is furnished by adjusting a piece of cambric tightly over the cover of a watch and placing an incandescent coal upon it. Though the coal may remain in contact with the cambric for a considerable time, it will be found to have sustained no damage. The reason is obvious. There is no local accumulation of heat, as it is absorbed by the metal before it has time to ignite the cambric. On the other hand, were the cambric similarly adjusted on any non-conducting substance, it would be at once charred and burnt, as the heat, instead of being conducted off, would be concentrated at the point where the coal rested upon the cambric. Professor TYNDALL made an experiment analogous to this by employing a cylinder half brass and half wood, and covering it with paper. He held its centre over the flame of a lamp, so that the flame played all round the cylinder. The result was that a black mark defined the line of junction between the wood and the brass. Where the paper covered the wood, it was charred, but where it covered the brass, it was uninjured, thus showing that a good conductor has such powers of abstracting heat, that even a flame that is in contact with it is rendered incapable of igniting a most combustible substance.

Trifling as these phenomena may appear they have, nevertheless, a direct bearing upon the question at issue. The same inevitable laws which divert the heat of a candle will enfeeble more or less the energies of the hottest furnace. With the emphatic evidence of the foregoing facts in view, it is difficult for one of even a limited capacity for logic to resist a strong impression that using a boiler that is exposed to the atmosphere not only paralyzes a large proportion of its powers but materially injures it, from the fact that a large addition of heat is necessary to compensate for that which escapes from the naked surface.

The sudden contraction and consequent straining of boilers when the fire is extinguished is a matter, too, that merits attention. Water is known to absorb rapidly by evaporation, and when there is no source to supply the heat thus withdrawn, intense cold is produced which augments cohesion and hardness in the iron, and renders it liable to break and snap asunder. On the other hand a suitable covering would always retain a sufficient reserve of heat to prevent any sudden reduction of heat within.

The London *Engineer* very justly observes that while no ingenious efforts had been spared to economise consumption of fuel by improvements in the steam engine, comparatively little had been done toward remedying the present defective boiler system which was, after all, the seat of the grievance in question. A fatal feature in the system referred to is, that the more we learn of it the worse it appears. The Report of the Hartford Steam Boiler Insurance and Inspection Company for last August states that in 750 boilers examined, 450 defects were discovered; 19 boilers were found to be dangerous, and two were condemned as unfit for use. But there is little occasion to adduce evidence of this kind when plain truth and reason is of so much weight and importance. Verily this is a case for common sense, and when common sense is decisive of a question it is almost needless to invoke experience. The experiments of LESLIE, METCALF, LYNDALL, RUMFORD and numbers of other experimenters, furnish evidence from which there is no appeal. Yet conclusive facts remain to a great extent unheeded or discredited, while valuable boilers are burnt, strained and prematurely used up, mainly from a defect which could be remedied at a comparatively small cost. Who can wonder that with such bad treatment iron-nature, refusing to be comforted with cement or pacified by the persuasive coersion of the cold chisel, rebels and often retaliates in a manner that horrifies the public conscience? To speak in the interests of science and plain sense, the remedy suggested by the foregoing facts should be adopted, seeing that it has peculiar advantages in its favor and ones which would, to a great extent, avert those now frequent and discreditable disasters known as "explosions and loss of life." If proprietors are not clear and decided in favor of economy they should be at least so in respect to humanity and justice. It is all very well to blame the engineers in charge, but the delinquency does not always rest with them. Boilers that have been subject to a fierce heat, and are rendered shaky, will often explode under the most careful management. It cannot be reasonably expected that these casualties can be reduced to zero; but, judging from their frequency, the inference is that in no department of science has the spirit of progress been more inactive. The prevalent system of exposing boiler surfaces cannot be sustained by the evidence of facts or by reason, while the arguments in support of clothing them have an intrinsic weight which no strength of incredulity can resist. It requires, therefore, no prophetic spirit to foretell that sooner or later the utility of boiler clothing will be universally and substantially recognized.

C. M. O'HARA, C. E.

NEW YORK, Nov. 10, 1869.

The Oil Trade.

MEETING OF THE PETROLEUM ASSOCIATION AT PITTSBURGH.

AT a meeting of the Pittsburgh Petroleum Association week before last, the president said he had received several communications in answer to inquiries by the Association relative to the change in gauging oil, etc, He then read a communication signed by nearly all the oil exporters in New York. The paper stated that the signers had become satisfied that the present system of gauging petroleum barrels with the straight rod had led their European correspondent to make frequent and serious complaints, caused,

1. By careless and inaccurate gauging.
2. By the peculiar construction of many barrels.
3. By the enlarged size of the barrels, and by other causes well known to the trade,

They had therefore pledged themselves from the first day of January next, to buy only by actual weight and tare, and they respectfully asked the oil dealers and refiners in New York, Philadelphia, Pittsburgh, Cleveland and other points, to meet them in their demands, which are based on justice and equity, and they furthermore ask them to inaugurate the new system on the first of January next. "Though well aware that the contemplated change involves many difficulties at home and abroad, yet we, for our part, are willing to submit to it for the common good, trusting to meet with the same spirit with refiners. We propose to compensate for the same by both prices, which, under the new system, will be obtainable, and also saving the refiners many expenses which are now unavoidable. Arrangements can be perfected by which the refiners will be materially benefitted. Under proper restrictions the oil can be inspected at Cleveland and Pittsburgh, and merely a small percentage of barrels need be opened here, to test the quality of the oil and correctness of taxes. This will save a large amount of money to the refiners, and prevent the barrels from being unnecessarily handled—a great advantage to the European purchasers. A few weeks will regulate the new system, and create a new era in the transaction, and cause dealers to wonder that the change had not been sooner made.

"The communication was received and filed.

"Mr. Lockhart moved that after the first day of January, 1870, all oil be sold by weight. Adopted.

"Mr. Morgan moved that a committee be appointed to arrange a plan for affecting the change, the plan to be submitted to the Association for action. Adopted; and the chairman appointed Messrs. Morgan, Lockhart, Mertz, Livingston and Forsythe."

MINING SUMMARY.

Nevada.

WHITE PINE BULLION CONSIGNED TO CHICAGO.

The Chicago *Tribune* says: "A consignment of silver bullion, amounting to a good value of over $17,000, was, on Saturday last, shipped eastward by the National Bank of Commerce, of this city, to whom it had been consigned, from the Treasure Hill Silver Mining and Milling Company, White Pine, Nevada. This is the second consignment received from Treasure Hill by this bank, which has been the first in Chicago to establish these relations with the great mining districts of Nevada. Weekly shipments are now being made, varying in amount from $17,000 to $20,000, and coming from different mines. This, it is confidently predicted, is the commencement in Chicago of an immensely important branch of commercial operations, the complete opening up of which will result in untold advantage to the city. Heretofore the silver bullion from these districts has been consigned to California, and there exchanged for money and goods; where also has been the market for mining stocks, and the headquarters of mining interests generally. This great interest should, and will, it is believed, if the proper steps are taken, revert to Chicago, which would become the silver centre of America. To-day Mr. Gillett goes to Hamilton, Nevada, with a ten-stamp mill manufactured in Chicago; and Messrs. Waller, Belvin, and others, who have gone to take possession of mining property, also contemplate the shipment of large mills from this city."

REVIEW OF MINING OPERATIONS.

The White Pine *News* of the 23d inst. has the following opening to its mining review: "As far back as the history of silver mining extends we have no record of any region which has produced as much bullion with as little exploitation, and in a period of time so short, as has Treasure Hill; and yet the developments being daily made confirm the belief that our miners are just coming to the great deposits of rich ore to which the 'feeders' heretofore worked naturally lead. Those whose faith in the permanency and richness of our mines was firm from the first, are astonished at the mammoth proportions and exceeding richness of the ore-deposits met with on the lower levels, or second and third deposits of the horizontal strata, while central openings in the various ledges or vertical deposits on the slopes of the hill show that mines of the latter class have not only not been 'worked out,' but have scarcely been prospected. Particularly is this the case in the famous Eberhardt, as will shortly be made manifest by the driving of the central (Defiance) shaft to a depth of 500 feet; in the Eclipse Consolidated, which is turning out large quantities of rich ore from the 112-feet level, below the second lap of limestone; and in the Aurora Consolidated, which carries the heaviest body of ore now or ever known to exist in the district. The Stanford Mill, 30 stamps, started up on Wednesday last. Bullion shipment for the week, $35,561 54.

THE COMSTOCK.

We herewith present a condensed tabular statement, taken from the San Francisco *Commercial Herald*, relative to the bullion product (so fas as can be ascertained), dividends paid, and assessments levied by the various mines on the Comstock Lode during the first nine months of 1869, together with the aggregate figures of previous like periods:

COMPANY.	Bullion Product.	Dividends.	Assessments.
Alpha	.....	.....	$30,000
American	.....	.....	17,400
Belcher	$18,312	.....	83,200
Bullion	.....	.....	50,000
Crown Point	.....	.....	60,000
Confidence	18,889	.....	31,200
Chollar-Potosi	1,094,351	$210,000	.....
Central	.....	.....	.....
Consolidated Virginia	.....	.....	17,400
Daney	.....	.....	56,000
Empire Mill & Mining Company	130,523	.....	30,000
Gould & Curry	169,586	.....	.....
Gold Hill Q. M. & M. Co	56,867	.....	10,000
Hale & Norcross	713,270	96,000	.....
Imperial	273,727	.....	60,000
Justice	.....	.....	30,000
Julia	.....	.....	12,500
Kentuck	455,259	40,000	40,000
Occidental*	210,000	20,008	.....
Ophir	.....	.....	100,800
Overman	283,171	.....	128,000
Segregated Belcher	.....	.....	6,400
Savage	1,068,662	280,000	.....
Sierra Nevada	130,189	29,500	.....
Yellow Jacket*	1,110,000	360,000	240,000
First nine months, 1869	$5,692,806	$1,035,500	$1,007,400
" " 1868	6,396,619	1,963,900	1,190,100
" " 1867	10,921,645	3,463,200	813,650
" " 1866	8,027,120	1,008,000	843,200

*Bullion estimated.

"CHOLLAR-POTOSI.

"For the week closing October 22d, 872 tons of ore were extracted,

against 965 the previous week. The faces in the Blue Wing locality of this mine do not look quite so promising as they did a week ago. On the 25th inst. the shipment of ore to four different mills amounted to 177 tons.

"IMPERIAL.

"The bullion returns for the third quarter of the current year aggregate $42,780, making a total of $273,729 for the first nine months of 1869.

"HALE AND NORCROSS.

"The ore extracted during the week ending October 22d amounted to 1,259½ tons, 335½ coming from the upper and 923¾ from the lower mine. During the same time they delivered 960 tons to custom mills, leaving on hand 2,690 tons. In the drifts now being run from the sixth station level, they continue to encounter the seams of rich ore found east of the east clay wall on the level above, the south drift being now fifteen feet in length, and the north drift thirty-four feet. During the period under review they cut the west vein on the fifth level at a point directly west of the shaft, where the producing portion of the vein is five feet wide, showing an average assay value of $55 to the ton. The cutting of the vein in this locality drains the main eastern vein, and enables them to work to better advantage and at a reduced cost. The long drift running west on the third level is being cleaned out, and winzes and drifts are being carried from the 300, 400, and 500-levels of the old mine. The bullion produced for the third quarter of the present year aggregates $265,759.

"GOULD AND CURRY.

"During the week ending October 25th, 427 tons of ore were extracted, and 350½ tons sent to reduction works. No important change is noticeable in the upper chambers of this mine. The El Dorado tunnel is now opened to a point known as the Seneca Branch, a distance of 800 feet. During the week twenty feet have been added to the south drift and fifteen feet to the north drift, from the seventh station, the work continuing in porphyry and clay.

"OPHIR.

"After an interruption of some days, through the breakage of the pump-rod, work was resumed in the drift on the morning of the 26th inst.

"SIERRA NEVADA.

"The winze is down over 75 feet, and they expect to commence drifting toward the ledge within a week.

"OVERMAN.

"This mine is reported to be improving. The bullion product during the third quarter of the current year amounted to $66,500, and for the first nine months to $223,171."

THE HUMBOLDT REGION.

The Humboldt *Register*, which suspended publication some months ago, again reappears at Winnemeca. We take from it the following items relative to the mines in its locality:

"GOLD RUN DISTRICT.

"The argentiferous galena ores of Gold Run district are at present attracting a good deal of attention. A San Francisco company has purchased the Cumberland mine, of Charles Hassen, and are preparing to commence active operations next week with a force of ten miners. The new comers, we understand, intend to ship the ore by the railroad to San Francisco for reduction. They are thoroughly skilled in the smelting business, and intend to reduce the ore by that process, as its metalliferous character renders separation from the gangue, by milling and amalgamation, impracticable. The Tartar mine, also located in this district, has been sold to a New York company, and the Superintendent, W. C. Gregg, intends to begin developing its hidden wealth in a few days.

"THE UNIONVILLE MINES.

"The Arizona mine at Unionville still continues to improve in richness as depth is attained. The Fall & Temple and Silver Mining Co.'s claims on this lead have yielded daily, during the present month, 100 pounds of fine bullion. This is exclusive of shipping ore, which, we learn from reliable authority, is in itself sufficient to pay all the expenses of both companies.

"GOLCONDA MINE.

"We learn from G. W. Holt that this mine is looking exceedingly well. It now employs twenty-five men. The company is running its mill by steam-power, and making regular shipments of fine bullion. A large quantity of tailings has accumulated which pays handsomely. The mill is now engaged about half the time in working tailings. Each shipment averages about $4,500. A very fine vein of ore several feet wide has been struck on the third south extension, which is equally as good as the original location."

THE BULLION YIELD OF THE MINES IN LANDER COUNTY.

We publish below a table of the bullion produced in this county for the quarter ending September 30, for which we are indebted to the *Reese River Reveille*, which says: "Excepting Mineral Hill, the ore was produced by mines situated in Lander county. We have omitted in the table all amounts of ore less than one ton, as well as all amounts credited to individuals instead of mines. The roll of the Assessor is cruder than usual, and, with the experience of several more quarters, it will be likely to exhibit the perfection of slovenliness.

REESE RIVER.

Mine or Company.	Tons.	Lbs.	Av. T.
Black Ledge	2	1,680	$297.48
Lodi	4	424	439.58
Harriet Lane	2	271	774.56
Immel	6	888	173.84
Harding and Dickman	9	606	62.21
Bailey	1	1,410	141.35
Royal American	1	278	63.20
Tuolumne	9	1,980	310.35
Niagara	3	944	248.52
Chicago	2	1,897	255.99
Maggie	7	540	75.20
Baker	7	597	154.80
Shakespeare	2	1,266	379.59
Plymouth	6	1,296	123.23
Kelly	1	308	267.00
Florida	3	609	427.50
" 2d class	17	—	133.74
Lane and Fuller Co.	460	1,271	139·12
" " 2d class	35	100	72.13
Jo. Lane	7	337	777.61
" 2d class	4	1,296	92.29
Troy	11	1,585	464.15
" 2d class	8	632	159.00
S. C. Baker	24	1,632	212.98
Manhattan Co.	638	1,592	109.35
Whitlatch Yankee Blade	8	675	337,51
" " 2d class	14	1,074	209.96
Smith Co.	2	490	429.76
Kihock	16	1,559	224.79
Homeward Bound	3	1,902	258.42
Wayant	1	264	591.34

CORTEZ.

Arctic and Garrison	271	1,660	81.12
Walker Co.	3	1,829	89.33
Ross Co.	26	1,517	122.21
Carter Co.	8	695	176.42
Taylor and Passmore	10	241	68.61
Kenney Co.	11	1,735	200.84
Berlin	4	531	72.13
Olsen Co.	7	1,356	139.60

MINERAL HILL.

Northey Co.	28	982	367.45
Corse Co.	6	978	150.59
Godwin Co.	1	1,114	228.90
Powell Co.	2	512	263.03
Spencer Co.	12	1,339	252.08
Yandell Co.	3	1,257	109.89

SPRING VALLEY.

Red, White and Blue	1	1,596	230.01
Berry Co.	9	712	181.75
Grant	1	1,750	385.58
Providence	1	70	58.42
Ross	1	1,290	92.86
Smith Co.	1	1,348	529.12
Woods Co.	5	1,164	53.16
Williams Co.	6	518	235.87

EUREKA.

Gem	7	514	112.12

The *Reveille*, commenting on the above, remarks: "Deducting the amount of ore, 56 tons 623 pounds from Mineral Hill, which is in Elko county, and we have 1,762 tons 973 pounds as the product of Lander county during the last quarter. The value of the bullion produced amounts to $253,197.60, which is an average of $139.21 per ton. That is about the average of the lot of 460 tons produced by the Lane and Fuller company. The average of the ore produced by the Manhattan company is considerably lower than that of several preceding quarters. The average of the ore produced in this particular district during the quarter is very good; Mineral Hill is high; Spring Valley (in small lots) is fair; while the average of Cortez is lower than usual. The Arctic and Garrison are totally distinct mines in the latter district, yet their product is lumped in the Assessor's roll; so that the value of the ore produced by either cannot be determined. As was the case in the previous rolls of the Assessor, the present one make Jones and Brown, and Smith and White, perform the marvel of yielding batches of chloride and sulphuret ore; for there are forty instances where lots of ore are credited to the miners instead of the mines from which they were obtained."

HEAVY SALE OF WHITE PINE MINES TO PHILADELPHIA CAPITALISTS.

The Hamilton *Empire*, of October 21st, says: "Israel E. Linsley and J. B. Osborn, by Israel E. Linsley, his attorney in fact, have effected a large sale of White Pine mining property to the Great American Basin Mining Company, a Philadelphia concern, incorporated by a special act of the Legislature of Pennsylvania. The consideration was $120,000, the receipt of the entire amount being acknowledged in the deed. The deed was received at the Recorder's Office, and placed on record yesterday. It was covered with stamps, Federal and State, to the amount of $240, and is among the heavy documents on record in White Pine County. Following is a list of the claims, including the number of feet, that have changed hands by this transaction: Glacier (north), 300 feet; Glacier (south), 500 feet; Black Ledge, 800 feet; Cinnabar, 1,000 feet; Idaho, 600 feet; Silver Bar (north), 400 feet; Silver Bar (south), 400 feet; Aladdin Lamp, 500 feet; Evening Shade, 300 feet; Silver Cloud, 600 feet; Divide, 600 feet."

Colorado.

ANOTHER TUNNEL.

The Georgetown *Miner*, October 28th, says: "Dr. S. K. Kane, of Ohio, a gentleman of large experience in mining, has organized the Helmick Tunnel Company, for the purpose of developing the great belt of silver-bearing lodes situated on Leavenworth Mountain. The mouth of the tunnel is situated on the north face of Leavenworth Mountain, about one mile from Georgetown, on the north fork of the south fork of Clear Creek, and immediately opposite the mouth of the Par Tunnel, on Republican Mountain. It will cut the summit 1,250 feet deep, in a distance of 2,050 feet, and will pass under the left-hand fork of South Clear Creek, into Griffith Mountain, 400 feet below the surface of the water."

INTERESTING NOTES.

The same paper has the following interesting notes on the mines: "L. Huepeden & Co. have shipped, since our last issue, three bricks of silver—two from Equator ore, one weighing 1,500.20 ounces, 795 fine, coin value $1,542.06; and the other 1,575 ounces, 837 fine, coin value $1,704.46, being of greater value than any one brick ever produced here by amalgamation. The third one was from Cascade ore, and weighed 190.90 ounces, 937 fine, coin value $231.28. The total number of ounces is 3,266.10, coin value $3,477.80. Their second chlorodizing cylinder will be ready to run by the first of the month, and we hope to see it fully supplied with ore. This doubles their capacity, and will double their bullion shipments, provided they do not want for ore. Dr. Rae, of Syracuse, N. Y., inventor of an electric process for the amalgamation of gold and silver, has leased a portion of the Knickerbocker Mill, at Empire, and will, as soon as his material arrives, make practical working tests on a large scale. The balance of the mill Mr. Munson will soon start up on Conqueror ore. The miners at the Conqueror Mine, at Empire, got through the 'cap,' and now have a fine body of solid iron. The shaft is 290 feet in depth. The owners of the mine have exhibited great energy and perseverance in driving the work on the mine, against many obstacles, to a point from which they may expect to reap a rich reward.

"The main shaft on the Equator lode is now 265 feet in depth, and just coming into a fine body of ore. The engine, boiler, and hoisting machinery for shaft No. 3, east, is soon expected here. The mine still continues to supply L. Huepeden & Co.'s works with sufficient ore to keep one chlorodizing cylinder busy. The Brown company shipped, on Monday last, 517 pounds, troy, or 6,204 ounces of silver bullion: coin value, $8,375.40; currency value, $10,888.02. The mine is in most excellent shape, and producing sufficient ore to guarantee the assertion that there will be no lack of bullion shipments for several months to come.

"BLACK HAWK ITEMS.

"A button of silver bullion, belonging to the Baker company, refined at the Brown company's works, weighed 1,815.08 troy ounces: coin value, $2,178.09. Holmes & Daws keep the old Hurd mill (20 stamps) running night and day, and George Kimball ditto with the Chicago mill with good results. Logue & Finley, who lately started up the Holdbrook mill, a short distance above, are crushing Kent Co. (Nevada) ore with most satisfactory returns. J. V. Kimber keeps his 26-stamp mill busy on California ore, with big returns."

Gulch mining in Colorado has ceased for the year 1869.

Idaho.

THE LOON CREEK MINES.

James McPherson, a responsible citizen of Helena Mountain, having just returned from a visit to these mines, thus writes of them in the Helena *Herald* of Oct. 21:—

"Oro Grand City is situated on Loon Creek, a tributary of the Middle Salmon river, about one hundred miles from Salmon city, or one hundred and twenty miles from old Fort Lemhi, in a southwesterly direction, across one of the most mountainous country in the Territory of Idaho. A good trail leads from Salmon to Oro Grande, across which no wagon can ever be taken. The country seems to be made up of one continuous set of ranges, from one to two miles high, and from three to ten miles in ascent and descent, making the trip a very dangerous as well as a tedious one. The city contains a floating population of about five hundred persons, many of whom are from Boise city or Leesburg. There will be about two hundred persons wintering in the camp, principally those who are interested in mining and other pursuits. The principal merchants are the enterprising firm of Messrs. Phillips & McNutt, of Leesburg, who have a very good stock of all kinds of miners' goods on hand, and are doing a very successful trade. The principal supplies come from Helena, via Bannack and Salmon city; the goods having all to be packed from the last named place, the rates charged being from ten to fifteen cents per pound in gold. The mines on Loon Creek are still in an undeveloped condition. Some claims are paying very well; others have not found the pay streak yet, but are in hopes of finding something remunerative soon. There is now two thousand inches of water running in the creek, which is very troublesome to control. Only one company are working on a drain. Claims Nos. 9, 10 and 11 have succeeded in fluming the river, and are realizing very satisfactory results. It is estimated that there will be ten thousand inches of water in the creek during May, June and July, which will necessarily suspend all mining operations at that season of the year, and be very detrimental to the camp."

Canada.

THE MADOC RAILWAY PROJECT.

In view of the fact that the mining interests of Madoc would be greatly benefitted should railway communication be established between it and the outside world, we reproduce from the Toronto *Monetary Times* the following relative to the plans now on foot to effect this greatly desired result:—

"The people of the township of Madoc very naturally desire a more expeditious way of getting to the front than is at present available: and, imbued with the progressive spirit of the times, call out for a railroad. A preliminary meeting was held on the 9th, at which a resolution, approving of a $10,000 bonus to such a railroad, was passed. The chairman stated that it was proposed to build a road either to Kingston, Cobourg, or Belleville, but that a connection with Kingston would be the most advantageous for Madoc; that a wooden railway on the new system, costing about $3,000 per mile, or $200,000 for the fifty miles, would answer their purposes; that among the bonuses granted would be from Madoc, Hungerford, Sheffield and Camden, $10,000 each; Elzevir, $5,000; other townships something more, and Kingston $50,000. On the 20th another meeting was held at Madoc, at which delegates from various municipalities and from Kingston and Belleville attended. The Kingston and Belleville men presented the claims of their localities, and a vote resulted in favor of the former. Mr. Flint stated that there were parties in Belleville ready to built the road for $6,000 per mile and give it up at the end of the year, besides paying four per cent. interest.

"The proposed route for the railway is such that it will tap the waters of three important rivers—the Napanee, the Salmon and the Moira—and cut the Frontenac, Addington, and Hastings colonization roads. If it take a line from Loughborough as a continuation of the line from Kingston to Knowlton lake (for which a charter has been obtained), it will open up a territory of 600,000 acres. The effect of the action of Toronto in respect of the Nipissing, the Grey and Bruce, and the Muskoka railroads is seen in the birth of such projects as the Madoc railway; and if this, the last-born project, be pushed on with energy and perseverance, great benefit must ensue to a district of country which is sadly in want of railway facilities, and to the province at large."

Minnesota.

SILVER AND COPPER MINES AT ENCAMPMENT.

We learn from the Superior (Wis.) *Tribune*, Oct. 16, that Mr. E. W. Anderson, Jr., a citizen of that place, has for some months, had a force of miners at work upon the silver and copper vein in which he is interested at Encampment, a town some thirty miles from Superior down the north shore of Lake Superior: "A shaft has already been sunk some twenty-five feet and a large quantity of ore taken out. On Tuesday last he sent down three more men and on the next trip of the schooner Charlie, from Beaver Bay, he expects to receive some five tons o. ore which he intends to forward immediately to New York and Liverpool, to have working tests made by the most skillful metallurgists. Assays already made by Prof. Eames, and by Dr. Walbank of this city, have satisfied Mr. Anderson and those interested with him, that silver and copper exist in handsomely paying quantities in the above mine; but still, to make 'assurance doubly sure,' they propose to have large quantities of the ore thoroughly tested by the most skillful chemists in the country, before purchasing machinery and commencing mining operations, on a very extensive scale. Either a valuable mine has been discovered at the above place, or else there has been some mistake as to the ore already tested and we hope that the former may prove to be the case."

Utah.

DEEP CREEK MINES.

THE *Evening News* of Salt Lake City gives the following additional particulars of the Clifton mining district, situated in the Deep Creek range of mountains, immediately north of the Western Union Telegraph line: "The rock is granite, which is considered one of the best formations for permanent mines. The mineral belt is very extensive, being about four miles wide and ten miles long. The ledges or veins are well defined, and can be traced for several thousand feet. There is a variety of ores in this district—an abundance of milling as well as smelting ore. The argentiferous galena is of very fine quality, and easily reduced. Assays of galena ores taken from the top of the ground run from $75 to $100 per ton. There is an abundance of wood and sufficient water for milling purposes; and plenty of saw timber in the mountains adjacent to the valley. There is a fine tract of agricultural land and an abundance of water for irrigating purposes; with plenty of hay land, and the finest and perhaps the most extensive stock range in Utah. Major Egan has a saw-mill near the settlement, and there is ample water-power for grist mills," etc.

California.

THE ALPINE COUNTY MINES.

THE Silver Mountain *Chronicle*, of October 9th, has these items: "Captain Jones arrived here on Monday from San Francisco, where he completed arrangements for smelting works for the Leviathan mines. These works consist of a fifteen horse-power engine, a blower, three furnaces, and a portable saw-mill. The fire brick necessary for the erection of the furnaces has been shipped from San Francisco with the machinery, and the entire works will be at the mine in a few days. The Leviathan is not only one of the richest copper mines in the world, but is also rich in gold and silver, which will more than pay the expense of reducing the ore.

"The work in Mountain tunnel is progressing finely, and never before have the prospects of the company been so flattering. Small strata of quartz are being cut almost daily, and water begins to come in freely. It is very evident that the ledge is not far distant."

MARKET REVIEW.

The Coal Trade.

NEW YORK, Nov. 12, 1869.

ANTHRACITE COALS.

WHOLESALE.—The market is firm, with an active inquiry for prepared sizes, particularly Stove and Chestnut, with no supply of the former, and but little offering of the latter. The larger sizes, Lump, Steamer, and Broken are in surplus, and can be had as low as $7.75 @ $8 for the Old Company Lehigh. The Scranton Company at Elizabethport are yet three weeks behind time in the delivery of their coals, making it appear to dealers almost a farce to attempt to supply their wants any longer by purchasing at the auction sales. We hear of cargoes of stove coal selling as high as $9.50, and buyers have to keep a sharp look out in the market to get a cargo even at that price. Most of the mines are in operation, except one or two in the Lehigh district. Those operators who are at work complain bitterly of the lack of accommodations or supply of cars to get their products to market. The strike on the Erie Railroad has interfered somewhat with the shipments of the Pennsylvania Coal Company; so we are cut off from our usual supply from Newburg, to some extent. Thus it is that one trouble after another comes up to interfere with the coal business. Dealers should take warning by these mishaps, and buy their coal early in the year. Had they taken the advice of this Journal during the months of June and July, and put in their stocks, they would not only have been spared paying the present high prices for prepared sizes of coal, but would have been reaping rich pecuniary results.

RETAIL.—Trade has been very brisk, and most dealers are far ahead on orders. Many report "not a pound of stove coal in yard." Prices are ranging from $9.50 to $10.50 delivered.

FREIGHTS.—An active trade has called more vessels into requisition, and from 10 to 15 cts. advance has been paid. Most captains refuse to go to the Scranton docks, at Elizabethport, unless regularly chartered at $10 per day. This, considering the length of time they are compelled to await their turn, is not exhorbitant.

BITUMINOUS COALS.

There is a good demand for Cumberland, Broad Top, and Powelton coals for manufacturing purposes and open grates for home use. Retailers, who have of late undertaken to introduce these coals to consumers, report general satisfaction among customers, and in many cases an actual preference over the Anthracite coals. This augurs well for these coals, and we bespeak for them still greater popularity when their merits shall have been more thoroughly tested. These coals are selling at $4.75 at Alexandria, $5.25 at Philadelphia, and $7.25 at New York.

The following table exhibits the quantity of Coal passing over the following routes of transportation to tide-water, for the week ending November 6, 1869, compared with the same time last year:

COMPANIES.	1868. WEEK.	1868. TOTAL.	1869. WEEK.	1869. TOTAL.
Phila. & Reading R.R.	89,940	2,747,697	109,817	3,276,271
Schuylkill Canal	33,563	842,977	19,811	599,130
Lehigh Valley R. R.	60,025	2,392,362	43,058	2,155,577
Lehigh and Sus. R. R.	13,387	430,604	32,069	757,769
Lehigh Canal	31,541	835,704		584,030
Scranton North	16,871	559,519	16,611	396,310
" " South	20,160	922,262	26,743	857,880
Penn. Coal Co., rail	19,986	793,794	15,227	823,184
" " " canal	1,305	27,235	833	16,919
Del. and Hudson, rail			6,776	128,295
" " canal, north	39,564	1,440,389	52,672	1,005,779
" " " south			6,790	102,738
Shamokin	12,156	431,679	11,598	387,156
Trevorton	1,555	27,073	1,763	28,623
Short Mountain	4,321	105,148	2,952	93,067
Lykens Valley Coal Co.	1,629	76,405	2,895	65,609
Huntingdon & Br'd Top	7,275	228,076	7,945	305,002
Wyoming South	9,958	238,949		275,228
" North	3,969	78,287	4,661	62,750
Williamstown, Col'y	4,143	159,642	6,611	175,109
Total	361,091	12,398,782	368,832	12,056,536
1869		12,056,536	361,091	
Decrease year		342,246	1.w7,741	

Schuylkill Coal Trade.

Report of coal transported over the Schuylkill Canal for the week ending Thursday, November 4, 1869.

	Tons. Cwt.
From Port Carbon	5,405 00
" Pottsville	966 00
" Schuylkill Haven	13,099 05
" Port Clinton	341 00
Total for week	19,811 05
Previously this year	549,318 15
Total	569,130 00
To same time last year	842,976 12

Report of coal transported over the Philadelphia and Reading Railroad during the week ending Thursday, Nov. 4, 1869.

	Tons. Cwt.
From St. Clair	41,726 11
" Port Carbon	7,903 19
" Pottsville	5,340 06
" Schuylkill Haven	31,386 10
" Auburn	4,119 13
" Port Clinton	16,346 06
" E. P. R. R.	56 13
" Harrisburg and Dauphin	14,412 00
Total paying freight	121,281 07
Coal for Company's use	3,268 19
Total for week	124,550 06
Previously this year	3,646,289 05
Total	3,770,838 11
To same time last year	3,188,206 07

Lehigh and Susquehanna Railroad.

Report of Coal Shipped South for the week ending Nov. 6, 1869.

WHERE FROM	WEEK. Tons. Cwt.	TOTAL. Tons. Cwt.
Total Mauch Chunk Region	12,160 08	176,481 17
" Hazleton "	84 01	119,652 07
" Upper Lehigh "		77,193 12
" Wyoming "	19,825 02	680,117 01
Grand Total	32,069 11	1,053,444 17
Corresponding week last year	28,941 06	852,777 18
Increase		200,666 19
Decrease	3,128 05	
Forwarded South from Mauch Chunk	30,351 19	705,779 06
Delivered on line of Lehigh & Sus'na R. R., above Mauch Chunk	1,045 92	29,389 10
Delivered to Lackawanna & Bloom. R. R., at Plymouth Bridge	632 10	17,469 09
Delivered to Lehigh Valley R. R. Co., at Sugar Notch		5,151 03
Delivered at Coal Port, for shipment by Canal		295,675 09
Total	32,069 11	1,053,444 17

Report of Coal Transported over Lehigh Valley Railroad

For the week ending November 6, 1869, and previously this season, compared with same time last year:

WHERE SHIPPED FROM.	WEEK. Tons. Cwt.	PREVI'S. Tons. Cwt.	TOTAL. Tons. Cwt.
Total Mahanoy	10,851 01	379,876 00	390,827 01
" Beaver Meadow	14,751 14	347,956 07	362,708 01
" Mauch Chunk	110 03	694 13	804 16
" Upper Lehigh		8,581 11	8,581 11
" Hazleton	6,488 01	701,788 17	708,276 19
" Wyoming	13,645 19	396,006 16	409,652 15
Total	45,946 19	1,834,904 04	1,880,851 03
To Lehigh & S. R. R., at P'n. Hav. for rail		4,562 07	4,562 07
Do. for canal		120,734 09	120,734 09
At Mauch Ch'k for canal		97,546 03	97,546 03
Total Anthracite	45,946 19	2,957,747 03	2,103,794 02
Bituminous Coal recv'd from Cats. R. R.			
N. C. R. R.			
E. P. R. R.		11,883 00	11,883 00
P. & N.Y. C. & R.R. Co			
Fall Creek			
Schroeder			
Towanda			
Total by rail and canal	45,946 19	2,969,630 03	2,115,677 02
Same time last year	67,715 00	2,324,647 15	2,392,362 15
Increase			
Decrease	21,768 00	255,017 12	276,785 13
Forwarded East from M'h Chunk by rail	43,058 03	1,780,417 13	1,823,475 16
Same time last year	52,025 04	2,008,525 08	2,060,550 12
Increase			
Decrease	8,967 04	228,107 15	237,074 16

RECAPITULATION.

Forwarded East from M'h Chunk by rail	43,058 03	1,780,417 13	1,823,475 16
Delivered at M'h Chunk	32 06	810 09	833 15
Delivered on line of road above Mauch Chunk	329 19	7,319 01	7,640 00
Delivered above M. Chunk for use of L. V. R.R.	1,398 00	38,729 13	40,127 13
To N. C. R. R., at Mount Carmel		2,516 09	2,516 09
Forwarded North from L. & B. Junction	1,064 07	1,100 12	2,164 19
To L. & S. R.R., at P'n Hav., for railroad		4,562 07	4,562 07
Do. for canal		120,734 09	120,734 09
Do. Packerton for rail	64 04	4,019 07	4,083 11
At M Chunk for canal		97,546 03	97,546 03
Total Anthracite	45,946 19	2,057,747 03	2,103,694 02
Bituminous Coal		11,883 03	11,883 00
Total all kinds	45,946 19	2,069,630 03	2,115,577 02

Cumberland Coal Trade.

B. & O. RAILROAD

The shipments over the Baltimore & Ohio Railroad for the week ending Nov. 6, 1869, were as follows:

From Cumberland & Pennsylvania R.R.	Tons.
Consolidation Co	1,659 12
Borden Co.	2,406 04
Balt. & Hampshire Co.	135 07
Midlothian Co.	51 09
From Eckhart R. R.	
C. C. & I. Co.	2,192 11
Total.	6,457 03

BY C. & O. CANAL.

For the week ending Nov. 6, 1869, the shipments by the Chesapeake & Ohio Canal were as follows:

	Tons.
American Co.	3,112 12
Borden Co.	1,870 03
Central Co.	2,035 04
Consolidation Co.	2,777 01
C. C. & I. Co.	858 19
George's Creek Co.	909 18
Hamp. & Baltimore Co.	1,101 14
Midlothian Co.	541 14
Maryland.	1,363 07
For private parties.	2,995 45
Total for week	17,936 01

Prices of Coal by the Cargo,

[CORRECTED WEEKLY.]

SCHUYLKILL.	AT NEW YORK, Nov. 12. R. A.	W. A.	AT PHILADELPHIA, Nov. 11. R. A.	W. A.
Lump	$- —	$7 00	- —	6 00 to - —
Steamer	- —	7 00	- —	6 00 to - —
Broken	- —	7 75	- —	6 50 to - —
Egg	- —	8 50	- —	7 00 to 7 50
Stove	8 50	9 00	- —	7 00 to 7 50
Chestnut	- —	7 00	- —	6 50
Pea	- —	- —	- —	- —
LEHIGH.				
Lump	- —	8 50	- —	- —
Steamer	- —	8 50	- —	- —
Broken	- —	8 00	- —	- —
Egg	- —	8 50	- —	- —
Stove	- —	8 50	- —	- —
Chestnut	- —	7 00	- —	- —
Pea	- —	- —	- —	- —
SPECIAL COALS.*				
Diamond Vein	R. A.	9 50	- —	- —
New England	"	- —	- —	- —
Locust Dale	W. A.	9 00	- —	- —
Honey Brook, Le'h	W. A.	8 00 to 8 50	- —	- —
Spring Mount.	" "	8 00 to 8 50	- —	- —
Sugar Creek	" "	8 00 to 8 50	- —	- —
Sugar Loaf	" "	8 00 to 8 50	- —	- —
Fulton	" "	8 00 to 8 50	- —	- —
Stout	" "	8 00 to 8 50	- —	- —
Old Comp'y's.	" "	8 00 to 8 50	- —	- —
Cross Creek	" "	8 00 to 8 50	- —	- —
Chauncey	" "	- —	- —	- —
Girardville	" "	- —	- —	7 00 to 7 50
McMichael	" "	- —	- —	7 00 to 7 50
Duncan	" "	- —	- —	- — to 8 00
Shamokin	" "	7 50	7 50	- —
Lykens Valley	" "	- —	8 00	- —
Broad Top	" "	- —	5 25	- —
Hill & Harris	" "	- —	7 25	- —
Henry Clay	" "	- —	7 50	- —
Powelton	" R.A.	- —	7 50	- —
Burnside	" "	- —	- —	8 00

BITUMINOUS COALS.

Kittaning Coal Co.'s Phœnix Vein f.o.b. at Phila.	$5 25
Lemon " " "	5 00
Cumberland C. & I. Co.'s on board N. Y.	7 25
Central C. & M. Co.'s " "	7 52
Consolidated Coal Co.'s " "	7 25

[*Dealers in these coals may be found in our advertising columns.]

Company Coals.

	L.	Str.	Gra.	Eg.	Sto.	Cst.
Scranton at E. Port	6 50	6 50	6 75	7 25	8 50	6 50
Pittston at Newb'g	6 40	6 40	7 00	7 50	8 25	6 60
Lackawana at Rond't.	6 50	6 75	7 00	7 25	8 25	6 75
Wilk'b're at Hoboken.	6 50	6 50	7 00	7 25	8 00	6 50

For freights to different points, see "Freights."

Prices for Coal at Mauch Chunk.

	F.L.	Bro.	Gra.	Eg.	Sto.	Cst.
Lehigh	$4 25	$4 75	$4 75	$4 75	$5 00	$4 25
Wilkesbarre	4 25	4 75	4 75	4 75	5 00	4 25

For freight to Elizabethport and to New York see "Freights."

Prices of Foreign Coals.

November, 1869.

Duty $1 25 per ton.

Corrected weekly by PARMELE BROS., No 32 Pine street, New York.

Liverpool Gas Caking	$ 9 50@— —
" " Cannel	14 00@— —
" House "	17 50@18 00
" Orrel	16 00@18 00

Per ton 2,240 lbs., ex-ship.

PRICES FROM YARD.

Liverpool House Orrel, screened	$16 00@18 00
" " Cannel, "	17 00@20 00

Per ton 2,000 lbs., delivered.

Prices of Gas Coals.

November, 1869.

PROVINCIAL.

Duty, $1 25.	Coarse. Gold.	Slack. Gold.
Block House	$1 75	@- 75
Gowrie	1 75	@- 75
Lingan	1 75	@- 75
Sydney	2 13½	@- 71½
Pictou	2 13½	@1 18¾
Little Glace Bay	1 50	@1 00
Caledonia	1 50	@- 75

AMERICAN.

	Coarse. Gold.	Slack. Currency.
Westmoreland Co.	- —	@- —
Despard Coal Co.	$8 50	@8 00
Penn.	- —	@- —
Newburg Orrel Gas	- —	@- —
West Fairmount Gas Coal	- —	@8 00

AT PHILADELPHIA.

Powelton	$7 80

Prices at Baltimore—OCT. 1869.

Wholesale Prices to Trade.

Wilkesbarre, by cargo or car load	$7 50@8 00
Pittston and Plymouth	7 25@8 75
Shamokin Red or White Ash	6 50@7 00
Lykens Valley Red Ash	7 40@7 90
Trevorton, Red Ash	- —@- —
By retail, per ton of 2240 lbs. delivered	9 00@9 75
Georges Creek & Cumberland f. o. b. at Locust Point for shipping	4 85@5 00
West Fairmount Gas f. o. b.	- —@6 50

Prices at Georget'n, D.C., & Alexandria, Va.

September, 1869.

George's Creek and Cumberland f. o. b. for shipping $4 75

Prices at Havre de Grace, Md.

October, 1869.

Wilkesbarre and other White Ash for cargoes	$- —@7 25
Lykens Valley	- —@7 50
Shamokin Red or White Ash	- —@7 25
Trevorton and Zebra Valley	- —@7 00

Freights.—NOVEMBER, 1869.

TO EASTERN PORTS.	From Philada.	From E. Port and Port Johnson	From Newburg	From Rondout
Stamford	$2 00	$1 15	$1 30	$1 25
Norwalk	2 00	1 15	1 30	- —
Bridgeport	2 00	1 15	1 30	1 25
New Haven	2 00	1 15	1 25	1 25
Hartford	2 75	1 75	- —	1 90
New London	2 00	1 40	1 60	1 60
Norwich	2 00	1 40	1 60	1 60
Mystic	2 00	- —	1 45	- —
Stonington	2 00	1 50	1 60	1 60
Sag Harbor	2 00	1 25	1 45	- —
Bristol	2 00	1 40	1 55	1 55
Newport	2 00	1 40	1 55	1 45
Fall River	2 00	1 45	1 55	1 50
Providence	2 00	1 40	1 60	1 60
Dighton	- —	- —	1 60	- —
Warren	- —	- —	1 60	- —
Pawtucket	2 00	- —	1 75	1 65
New Bedford	2 00	1 50	- —	1 75
East Cambridge	2 10	- —	1 85	2 10
Salem	2 50	2 00	2 20	2 20
Newburyport	2 50	2 00	1 85	2 20
Portsmouth	2 50	2 00	2 10	2 10
Rockport	- —	- —	1 90	- —
Saco	2 75	2 00	- —	2 00
Portland	2 50	2 00	2 20	- —
Bangor	2 50	- —	1 75	1 80
Bath	2 50	2 00	2 05	2 00
Middletown	- —	1 50	- —	- —
Amesbury	2 50	- —	- —	- —
Boston	2 50	2 00	2 25	2 25
Cambridgeport	2 50	- —	1 85	2 05
Taunton	2 50	2 00	1 95	- —
Derby	2 00	1 25	1 90	- —
New York	1 55	80	85	85
Hackensack	1 75	- —	- —	- —
Jersey City	1 65	80	85	85
TO RIVER PORTS.				
Troy	1 75	1 25	60	65
Albany	1 75	1 24	55	50
Coeyman's	1 60	- —	55	50
Stuyvesant	1 50	- —	50	45
Cocksackie	60	- —	45	45
Hudson	- —	90	40	50
Catskill	- —	- —	40	35
Poughkeepsie	1 60	75	30	25
Fishkill	1 60	- —	20	30
Cold Spring	1 60	70	30	50
Haverstraw	- —	50	45	55
Nyack	1 60	50	55	50
Sing Sing	1 60	- —	60	50
Yonkers	- —	40	60	55
New York	1 55	80	70	- —
Saugerties	1 55	- —	35	30
Rhinebeck	1 60	- —	30	35
Rondout	1 60	60	30	25
Tarrrtown	1 60	80	60	- —
West Point	1 60	75	30	50

Rates of Transportation to Tide Water.

BY RAILROAD.

TO PORT RICHMOND, PHILADELPHIA.

Philadelphia and Reading Railroad, from Schuylkill Haven $2 50

From Port Carbon, 8 cents per ton more.

TO ELIZABETHPORT.

L. V. Railroad from Mauch Chunk to Easton	$1 15
C. R. R., N. J., Easton to Elizabethport	1 70
Shipping expenses at Elizabethport	25
Total	$3 10

TO PORT JOHNSON.

L. V. R. R.	$1 15
C. R. R., of N. J.	1 80
Shipping expenses	25
Total	$3 20

TO HOBOKEN.

L. V. R. R.	$1 15
Morris & Essex R. R.	1 80
Shipping expenses	25
Total	$3 20

TO SOUTH AMBOY.

L. V. R. R.	$1 15
B. & D. R. R.	1 10
Cam. & Am. R. R.	50
Shipping Expenses,	25
Total	$3 00

BY CANAL.

Via Schuylkill Canal.

TO PHILADELPHIA.

From Schuylkill Haven	$1 70
" Port Carbon	1 70
" Port Clinton	1 70

TO NEW YORK.

From Schuylkill Haven	$2 20

Via Lehigh Canal.

TO PHILADELPHIA.

Lehigh Canal	$1
Freight and towage	1
Total	$2 29

TO NEW YORK.

Lehigh Canal	$ 71
Morris "	85
Freight	1 70
Towing	10
Total	$3 36

TO JERSEY CITY.

Lehigh Canal	$ 71
Morris "	95
Freight	1 60
	3 25
For re-shipment	30
Total	$3 56

Via Delaware and Raritan Canal.

TO NEW YORK.

Lehigh Canal	$ 71
Delaware Division Canal	43
Delaware and Raritan Canal	57
Freight	1 45
Towage	20
Total	$3 36

TO NEW BRUNSWICK.

Lehigh Canal,	$ 71
Delaware Division Canal,	43
Delaware and Raritan Canal,	57
Freight,	1 20
Total,	$2 91

For Re-shipment—30 extra for shipping, and 10 cents. drawback.

Foreign and Provincial Freights.

September, 1869.

Foreign.	
Newcastle and Ports on Tyne	£15@£18 keel
Liverpool	15s. 17s. to

TO NEW YORK.

Provincial.	
Sidney	$3 25
Lingan	3 25
Cow Bay	3 75
Port Caledonia	3 25
Little Glace Bay	3 25

TO BOSTON.

Sydney	$2 75
Lingan	3 75
Cow Bay	3 25
Port Caledonia	3 00
Little Glace Bay	2 25

Towing Rates.

TO EASTERN PORTS.

	Per Ton.
To New Haven	$ 40
Bridgeport	40
Southport	40
Westport	40
Norwalk	40
Stamford	40
	Per Boat.
Greenwich	$70 00
Port Chester	80 00
Mamaroneck	70 00
Glen Cove	55 00
New Rochelle	55 00
East Chester	60 00
West Chester	30 00
White Stone	30 00
College Point	25 00
West Farms	25 00
Flushing	30 00
Harlem and Mott Haven	20 00
Port Morris	20 00
Ninety-first street and Astoria	16 00

Boats beyond Port Chester, with less than 200 tons, $20 per Boat.

TO RIVER PORTS.

Boats of 150—250 Tons.	Per Ton.
To Manhattanville	9 cents.
Spuyten Duyvil	9 "
Yonkers	10 "
Hastings	12 "
Piermont	15 "
Dobbs' Ferry	15 "
Nyack	16 "
Tarrytown	17 "
Sing Sing	18 "
Croton Landing	19 "
Haverstraw	19 "
Verplanck's	20 "
Peekskill	20 "
West Point	21 "
Cold Spring	21 "
Newburgh	22 "
Poughkeepsie	22 "
Rondout	23 "
Boats of 100 Tons.	Per Boat.
To Manhattanville, and Return	$12 0
Spuyten Duvvil, "	14 00
Yonkers, "	15 00
Sing Sing, "	25 00
Peekskill, "	25 00

METALS.

IRON.—Duty: Bars, 1 to 1½ cents ₱ lb; Railroad, 70 cents ₱ 100 lbs.; Boiler and Plate, 1½ cents ₱ lb; Sheet, Band, Hoop, and Scroll, 1¼ to 1¾ cents ₱ lb; Pig, 9 ₱ ton; Polished Sheet, 3 cents ₱ lb.

Pig, Scotch No. 1, ₱ ton	35 00@37 00
Pig, American, No. 1	40 00@41 00
Pig, American, No. 2	37 —@38 —
Pig, American, Forge	36 —@— —
Bar, Refined, English and American	85 —@— —
Bar, Swedes, assorted sizes (gold)	82 50@85 00
	Store Prices.
Bar, Swedes, ord'y sizes, less 5 ₱ ct.	— —@140 —
Bar, Refined " "	95 —@100 —
Bar, Common " "	87 50@ 90 —
Scroll " "	120 —@130 —
Ovals and half-round " "	120 —@145 —
Band " "	120 —@— —
Horse Shoe " "	120 —@— —
Rods, ⅜ to 3-16 inch " "	100 —@155 —
Hoop " "	125 —@130 —
Nail rod, less 5 ₱ ct.	— 8½@— 9½
Sheet, Russia, as to Nos. (gold)	— 10¾@—11½
Sheet, Single, D. and T. Common	— 5¼@— 7
Sheet, Galvanized List 15@25 ₱ cent. discount.	
Rails, English (gold), ₱ ton	57 00 @— —
Rails, American, at Works in Pa	— —@77 00 ₱

STEEL.—Duty: Bars and ingots, valued at 7 cents ₱ lb or under, 2½ cents; over 7 cents and not above 11, 3 cents ₱ lb; over 11 cents, 2½ cents ₱ lb, and 10 ₱ cent ad val. (Store prices.)

English Cast (2d and 1st quality) ₱ lb	— 18 @— 22
English Spring (2d and 1st quality)	— 9 @— 11¼
English Blister (2d and 1st quality)	— 11½@— 19
English Machinery	— 12½@— 15
English German (2d and 1st quality)	— 14 @— 16
American Blister "Black Diamond"	— 10½@— 11½
American, Cast, Tool do.	— 19 @— —
American, Spring, do.	— 10 @— 13
American Machinery, do.	— — @— 13
American German, do.	— 10 @— 13

COPPER.—Duty: Pig, Bar, and Ingot, 5; old Copper cents ₱ lb; Manufactured, 45 per cent. ad val.

	All Cash.
Copper, New Sheathing, ₱ lb	— @— 32
Copper Bolts	— @— 33
Copper Braziers, 16oz. and over	33 @— 35
Copper Nails	38 @— 40
Copper, Old Sheathing, &c., clean	20 @— 21
Copper, Chili Pig	— @— —
Copper, American Ingot	22¼@— 22½
Yellow Metal, New Sheating	— @— 27
Yellow Metal Bolts	— @— 27
Yellow Metal Nails	— @— 27

LEAD.—Duty: Pig, $2 ₱ 100 lbs.; old Lead, 1½ cents ₱ lb; Pipe and Sheet, 2¼ cents ₱ lb.

Galena, ₱ 100 lbs	$— — @— —
Spanish (gold)	6 40 @6 50
German, do.	6 40 @6 55
English, do.	6 40 @6 87½
Bar (net)	8 50 @— —
Pipe and Sheet (net)	8 50 @— —

TIN.—Duty: Pig, Bars, and Blocks, 15 ₱ cent. ad val.; Plate and Sheets and Terne Plates, 25 ₱ cent. ad val.

	Gold ₱ lb.
Banca	33¼@33½
Straits	33¼@33½
English	31¾@32

PLATES.	Fair to Good Brands. Gold.	Currency.
I. C. Charcoal, ₱ box	$8 12½@8 37½	$11 00 @11 50
I. C. Coke	6 75 @7 37½	9 00 @10 25
Coke Terne	— — @6 00	— — @ 8 50
Charcoal Terne	7 75 @8 25	10 50 @11 25

SPELTER.—Duty: In Pigs, Bars, and Plates, $1 50 ₱ 100 lb.

	Gold.
Plates, Foreign ₱ 100 lbs.	$6 12½@6 25
Plates, Domestic ₱ lb.	- 9 @- 12

REMARKS.

IRON.—There has been a steady demand for [illegible] and prices, though not quotably [illegible]ged, have a hardening tendency. The sales are 500 tons Glengarnock at $36@$37; 200 do. Eglinton, $34@$35, both ex-ship; 50 do. Eglinton, $37.50; and 50 do. Gartsherrie, $41 from yard. There is very little inquiry for American, and prices remain as previously noted; 100 tons No. 2 ex-Thomas sold at $38; and 300 do. White, on private terms. The market for new Rails remains quiet. We quote English $57 gold, and American $77 currency, at the works in Pennsylvania; 300 tons old Double Headed sold on terms we did not learn. Bar has not yet responded to the advance of 20s. in England, reported in our last, and the market here continues dull at old prices. We notice further sales of 150 packs Russia Sheet, assorted numbers, at 10¾ cents gold; and 50 do. from dealers' hands, Nos. 12 and 13, at 14 cents currency.

COPPER—Continues quiet. Speculators are not ready to buy, and the demand is confined principally to the manufacturers. We note considerable sales since our last at 22¼@22¾c. for Lake, 22¼c. for Baltimore and Tennessee. There is but little inquiry for forward delivery; but lots on spot are firmly held at above quotations.

TIN.—The market retains its firmness at 33¼c. to 33¾c. for Straits; 32@32¼c. for English; 35¾@36c. for Billiton; 38c. for Banca—all gold. There is but very little offering at above prices.

LEAD—Can now be had at 6¾c. to 6-45 on spot and [illegible]6¾ to arrive—ordinary Foreign. The demand is good.

ANTIMONY.—We note an advance in England, Nov. 4th, of £4—making quotation there £54. Market here was then 12¾c. to 12¾c.; but upon the above advance being made known, 100 casks were taken

up at these prices, and the market immediately advanced to 13c. It can now be had at 12¾c., at which price market closes firm.

SPELTER.—We note sales of 50 tons prime Silesian at 6¼c. gold. Market now steady at this price, and but little offering.

STEEL—Continues very steady at our quotations, for lots as wanted from store.

ZINC.—American, dry, 8½c.; French, dry, 11¼c.; French, metallic, 11½c.

MANGANESE—5c. per lb.

Mining Stocks.

NEW YORK, Nov. 11,1869.

Prices have not improved. 400 Smith and Parmelle sold to-day—s3 at $1 75, and 300 Central at 87c.

Petroleum stocks are more dealt in at higher rates. 1,000 United Pet. Farms were sold to-day at 21, and United States 75. The following are the latest quotations:

	Bid.	Asked.
Bennehoff	30	35
Clinton Oil	2 50	—
Brevoort	1 60	1 90
Buchanan Farm	40	48
Home Petroleum	8 00	8 60
Central	80	95
New York and Alleghany	1 00	—
National	1 00	—
United States	—	—
Northern Light	70	1 00
United Petroleum Farms	20	—
Rynd Farm	31	35
Pithole Creek	1 55	1 75
Bergen Coal and Oil	—	—
Second National	35	—

San Francisco Stock Market.

SAN FRANCISCO, November 10 1869.

	1st Board.	2d Board.
Savage	68	68½
Crown Point	—	17
Yellow Jacket	—	49½
Kentucky	1 73	1 80
Cholar Potosi	23	25
Gould & Curry	—	85
Ophir	—	15
Alpha	—	20½
Belcher	No Sales.	
Imperial	—	52
Hale & Norcross	—	1 75

Fancy Coloring of Metals.

For some time past, on the Continent, as well as in England, the coloring matter of small objects in metals has occupied the attention of manufacturers and chemists. M. Puschée, a German chemist, gives the following receipts for the application of sulphur to the purposes referred to. 1. A solution is made in the following manner. dissolve 4 oz. of hypo-sulphate of soda in a pint and a half of water, and then add a solution of 1 ounce of acetate of lead in the same quantity of water. Articles to be colored are placed in the mixture, which is then gradully heated to boiling point. The effect of the solution is to give iron the effect of blue steel; zinc becomes bronze, and copper or brass becomes, successively, yellowish red, scarlet, deep blue, light blue, bluish white, and finally, white, with a tinge of rose. This solution has no effect on lead or tin. 2. By replacing the acetate of lead in the solution by sulphate of copper, brass becomes first of a fine rosy tint, then green, and finally, of an iridiscent brown color. Zinc does not color in this solution; it throws down a precipitate of brown sulphuret of copper, but if boiled in a solution containing both lead and copper, it becomes covered with a black adherent crust, which may be improved by a thin coating of wax. 3. If the lead solution be thickened with a gum tragacanth, and pattern be traced with it on brass, which is afterwards heated to 212 degrees, and then plunged in solution No. 1, a good marked effect is produced.

A Claim for Mining Lands in California.

ONE of the numerous cases in which William McGarrahan is plaintiff, and by which he hopes to establish his claim to a valuable tract of land in California, was before the Supreme Court of the District of Columbia on the 28th ult. In January, McGarrahan made application for a *mandamns* to compel Mr Browning, the then Secretary of the Interior, to issue him a patent for the land claimed. Mr. Browning denied the jurisdiction of the Court, but by an arrangement between counsel it was agreed that the judgment of the Court upon the application might be rendered in vacation, as of the January term, 1869. Meantime, Mr. Cox became Secretary of the Interior, and on July 8, the May term having intervened, an order or decree for the *mandamus* was entered by Judges Fisher and Olin. Secretary Cox now asks that the writ may be quashed: First, on the ground of irregularity, as too mmch time had been permitted to elapse between the application and the date of the judgment, a Court term having intervened; and, second, because the judgment was in violation of the act of Congress upon which McGarrahan bases his claim, which excepts from the right of purchase therein given all lands containing mines of gold, silver, or cinnabar, and as the new Idrea Mines Company had filed a claim for a cinnabar mine thereon. The motion to quash the writ was reserved for future action.

A Safety Car-Wheel.

One of the most frequent causes of railroad disasters is defective rails. A train of cars running at high speed exerts a tremendous outward pressure against the rail, and if there is a weak spot in the rail it is almost certain to break, causing, in many instances, great loss of life. The recent disasters have called forth many devices for preventing these terrible accidents. Juries have repeatedly censured railway companies for using poor iron. Steel rails have been laid down on many of the best roads, yet the utmost care has not been sufficient to detect the hidden flaws, and to prevent hundreds of people from being hurled to destruction. Three months ago, Mr. L. D. Boyce, of Rochester, N. Y., invented a safety car-wheel, which is now on exhibition in this city. The inventor claims that, even when a rail is broken in several places, the train cannot leave the track. A day or two ago, a man was seated on the model car, and one of the rails was removed, yet the other rails held the car in its place while one side of it was dragged across the ties to the sound track beyond. The invention consists of an axle, with two wheels attached to either end. These wheels run on both sides of the rail, but they do not touch it except where the surface of the inner one rolls on the top. The bevel of the wheels is such that when a car is off the track, the outer wheels force it on again, for they cannot leave the track so long as there are any sound rails. The invention is very simple, and if it works as well in practical use as it does at No. 86 Chambers street, it will not be impossible to run trains at the speed of sixty miles an hour with comparative safety.

The Great Eastern.

THE Great Eastern, with upwards of 2,000 miles of the Indian cable on board in her three enormous tanks, left the Medway, England, on Saturday, October 24, about noon, just before the top of the tide. According to the latest arrangements, she will proceed under easy steam to the Portland Roads, where, after receiving on board the remainder of her stock of coal, she will steam direct to the Red Sea, *via* the Cape of Good Hope, to commence laying the cable which is to connect Suez with Bombay. The Great Eastern will be navigated from the Medway to Weymouth by Navigating Lieutenant G. Brockham, of her Majesty's steamer Wildfire, who has had the sole charge of the vessel on the several occasions of her arriving at and leaving the Medway. She is expected to be absent from England for three or four months, and immediately on her return she will commence the shipment of the cable manufactured by the Telegraph Construction and Maintenance Company, to be submerged between Falmouth and Malta, where it will be connected with the existing cable from Malta to Alexandria, thus completing the connection between England and India.

The Diamond Supply.

THE discovery of two new diamond fields—those of the Cape and of Victoria—has come in good time to meet the demand. The East Indian supply has long since declined, and the market have of late years been dependent on Brazil. On the whole, the fashion for diamonds has declined in Russia, Turkey, Spain, and Portugal, though a rise was created by the fashion in Paris under the Empire and in the United States. For small diamonds or diamond dust for trade purposes the want has increased, and the price sometimes reaches $4,500 per ounce.

New Method for Joining Iron Tubes.

CAST-IRON tubes for water or gas are now made in England by turning off one end conically, and boring out the ends of the tubes to which it is to be fitted at the same angle, so that the end of one tube may be inserted into the other without the addition of the ordinary cement. The junction is effected very quickly, and the joint is perfectly tight. Pipes thirty-six inches in diameter have been perfectly joined in this way. Liverpool has about ninety miles of gas pipe with this joint, and the leakage is said to be much less than in other cities.

Discovery of Coal in Providence.

Two beds of coal have been discovered by a Mr. McLaughlin, well-borer, in sinking a well for water in a foundry yard in Providence, Rhode Island. Agreeable to his statement, the drill passed through a bed of coal fourteen feet thick, at the depth of one hundred and nineteen feet, and a second bed of coal of six feet in thickness, at the depth of one hundred and thirty-four feet. He stated that there was not any intervening slates in the beds of coal. The specimens of coal taken out contain eighty per cent. of carbon.

MINING COMPANIES AND STOCK QUOTATIONS.

GOLD AND SILVER COMPANIES.	SITUATION OF MINE.	SECRETARY AND PLACE OF BUSINESS.	CAPITAL.	PAR VALUE.	OFF'R'D.	ASKED.
Alameda Silver		A. Queran, 108 Wall st.	$2,000,000	$10 00		
Ada Elmore	South Boise, Idaho					
American Flag	Nevada District, Col.	P. P. Fullerton, 71 B'way.	600,000	10 00		
Atlantic and Pacific	Humboldt Co., Nevada.					
Bates and Baxter	Colorado			50 00		
Benton	Colorado	W. F. Drake, 15 Broad	500,000	5 00		
Briggs	Colorado	J. P. Davies, 19 Cliff	1,000,000	100 00		
Black Hawk	Colorado	C.T.Whittington, 48 Broad	2,500,000	100 00		
Bobtail	Colorado	J. Stanton, Jr., 25 Nassau	1,000,000			
Bullion Consolid'ed Gold	Colorado					
Burroughs Gold	Colorado					
Church Union Gold	California					
Consolidated Gregory	Colorado				1 35	1 45
Combination Silver	Nevada			100 00	1 50	
Columbia Silver	Austin, Nevada	J. M. Brown, 155 B'way	5,000,000			
Commercial Silver		J. E. Smith, 26 Pine	3,000,000			
Corydon	Gilpin Co., Colorado	J. Samuels, 40 B'way	500,000			
Downieville	Colorado		2,500,000	25 00		
Eagle Gold	Gold Dirt Dist., Col.	J. P. Davies, 19 Cliff	300,000	1 00		
Empire Gold and Silver	BodieBluff,MonoCo.Cal	H. K. Gates, 70 B'way	1,000,000			
Edgehill		A. Fullerton, 71 B'way	10,000,000			
Esperanza Silver		Ezra Clark, Jr., 13 William	400,000			
Fisk Gold		H. Johnson, 195 Fulton	500,000			
Forest Queen		E. B. Beet, 62 B'way	1,000,000			
Golconda Gold	Sherbrooke, C. E.	H. Adams, 71 Broadway	2,000,000			
Gregory	Colorado		1,250,000			
Gunnell Gold	Colorado	J. H. Rolston, 80 B'way	1,000,000	50 00		39
Gunnell Central	Colorado	C. B. Bostwick, 16 B'way	3,060,000	10 00		
Gold Rock		R. M. Lockwood, 93 Wall	400,000			
Grass Valley					22	26
International Silver		J. W. Brazier, 26 Pine	600,000			
Hope Gold	Colorado		5,000,000			
Holman			2,000,000	25 00		
Kipp & Buell	Colorado		300,000			
Knickerbocker Gold		J. H. Rolston, 80 B'way	200,000	100 00		
La Crosse Gold	Nevada Dist., Col.	P. P. Fullerton, 71 B'way.	1,000,000			
Lander Hill T. & S.	Nevada	M.L.Catherwood,74 B'way	1,000,000			
Lewis Gold	Georgia		1,000,000			
Liberty Gold						
Manhattan Silver	Nevada	M. L. Ogden	400,000			
Maraposa common	California	Jas. H. Ferdon, 34 Wall	12,000,000		7⅞	8¼
Mariposa preferred	California	do. do.			15⅝	16⅛
Montana Gold		G. De Cordova	400,000			
Montana M. L. & M. Co.	Montana	A. M. Hoyt, 22 William	250,000			
Montrose	Clear Creek Co., Cal.	W. W. Perkins, 71 B'way	1,000,000			
New York Silver	Nevada	Thos. Sproull, 78 B'way	1,500,000			
New York and Austin	Nevada	E. R. Siccomb, 70 Wall	500,000			
New York and Owyhee	Owyhee Co., Idaho		1,000,000			
New York and Eldorado		G. H. Munroe, 10 Wall	2,000,000			
N. Y. & Montana M. & D.	Montana	F. A. Chapman, 20 Nassau	1,250,000			
N. Y. & Silver Peach	Nevada	R. C. Root, 74 B'way	2,000,000			
N. Y. & Utah P. & M.		W. H. Mailler, 108 Wall				
Ophir Gold	Comstock Lode, Nev.	L. C. Warner, 70 B'way	625,000			
Owyhee Gold		W. H. Smith, 43 Ex. Place	1,700,000			20 00
Pahranagat Central	Nevada	J. E. Smith, 25 Pine	6,000,000			
Quartz Hill Gold		F. Bernard	2,500,000		1 15	1 35
Reese River Consol'd	Nevada	W. B. Ogden	6,000,000			
Rocky Mountain	Colorado	S. M. Pond, 70 B'way	500,000	10 00		
Rollins Gold		Thos. Bond, 132 B'way	600,000			
Sensenderfer	Colorado	H. A. Shewill, 19 Broad	1,000,000			
Silver Bend		F. W. Macy, 20 Nassau	1,500,000			
Silver Mt. Silver		H. A. Moen, 71 B'way	1,000,000			
Silver Peak & R. M.	Nevada	W. B. Ogden, 52 Wall	5,000,000			
Smith & Parmelee	Colorado	W. H. Hollister, 6 Broad	2,500,000	20 00	1 75	1 85
Social & Steptoe Con.		T. H. O'Connor, 24 Nassau	450,000			
Standard Gold		C. B. Bostwick, 169 B'way	500,000			
Symonds Forks					40	60
Twin River Silver	Nevada	J. F. R. Hadden, 20 Nassau	800,000	100 00		
Texas Gold	Colorado		500,000	10 00		
Union Gold	Colorado	F. A. Potts, 110 B'way	1,200,000			
Wash. Mill & Silver	Nevada	W. W. Perkins, 71 B'way	300,000			
Wauba Yuma	Arizona	J. W. Silsby, 36 Pine	6,000,000			

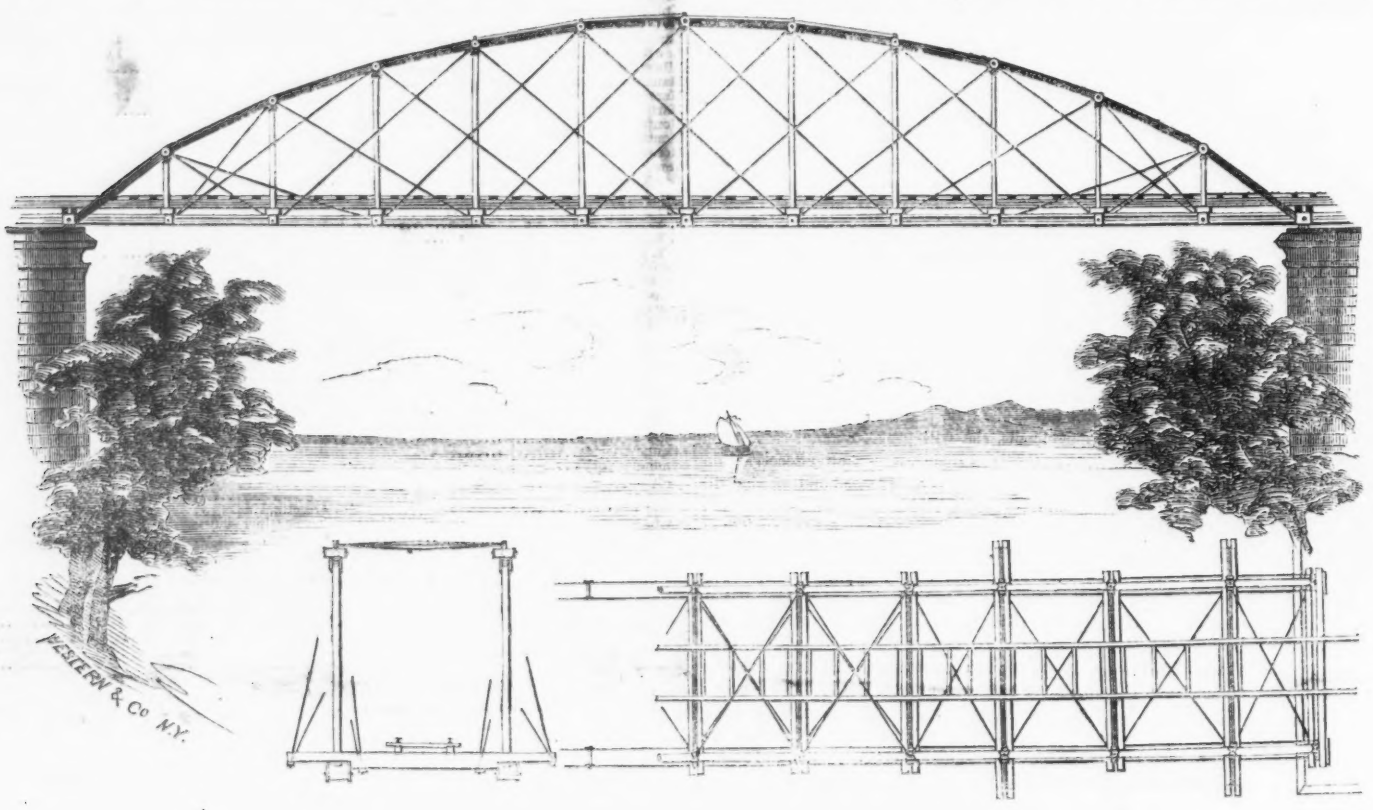
COAL AND IRON COMPANIES.	SITUATION OF MINE.	SECRETARY AND PLACE OF BUSINESS.	CAPITAL.	PAR VALUE.	OFF'R'D.	ASKED
American Coal Co		M. A. Myers, 119 B'way	$1,500,000	$25 00		
Ashburton Coal Co		J. T. Rollins, 41 Pine	2,500,000			
Block House Coal		D. B. Keeler, Jr., 43 Pine	1,000,000			
Brewster Iron		H. Robison, 165 B'way	150,000			
Broad Top Coal & Iron Co	Pennsylvania	B. Love	2,000,000			
Cameron Coal Co		J. A. Simpson, 40 B'way	2,500,000			
Carbon Hill Coal Co		J. Silsby, 36 Pine	1,000,000			
Central Coal		F. P. White, 111 B'way	2,000,000	100 00		
Clifton Iron Co		P. H. Riordan, 34 Pine	1,250,000			
Columbia Iron		E. D. Webb, 77 Cedar	1,000,000			
Consolidation Coal	Maryland	J. S. Mackie, 71 B'way	5,000,000			
Crawford Coal		E. Clapp, Prest, 137 B'way	1,000,000			
Cumberland C. & I. Co		E. Kisean, 90 B'way	5,000,000		27	27½
Derby Coal Co		W. S. Davison, 11 Broad				
Dover Coal and Iron Co		L. Chase, 88 Wall				
Del. & Hudson Canal Co			10,000,000	100 00		
Ebervale Coal		G.L.Stout, Treas.,111 Br'y	500,000			
Fall River Bituminous		D. T. Blauvelt, 43 Pine	1,000,000			
Farrar Coal		C. H. Jones, 43 Pine	250,000			
Fisher Iron Co		M. Ellis, 19 William	100,000			
Hamp're & Balt. Coal		S. M. Pond, 70 B'way	500,000			
Iron Cliffs Co		C. J. Canda, 52 Wall	1,000,000			
Jackson Iron		G. P. Loyd, 119 B'way	300,000			
Kemble Coal & I. Co		R. A. Wight, 26 Ex. Place	300,000			
Keokuk Coal		J. F. Franklin, 112 B'way	100,000			
Lackawanna I. & C	Pennsylvania	E. C. Lynde, 52 Wall	1,200,000			
Lewis Run C. & I. Co		C. A. Sanborn, 80 B'way	750,000			
Lykens Val. Coal Co		F. A. Platt, 13 William	800,000			
McKean Co. Bit. Coal Co.		J. H. Rolston, 80 B'way	1,500,000			
Lehigh & Susquehanna						
Mahanoy			400,000	100 00		
McNeal C. & I. Co		C. C. Godwin, 71 B'way	500,000			
Mount Riga Iron		G. M. Newton, 42 Cedar	300,000			
New Boston Coal		C. H. Ogden, 55 B'way	2,000,000			
N. Y. Con. C. & I. Co		A. T. Levine, 16 Wall				
N. Y. & Lehigh Coal		T. Simpson, 111 B'way	150,000			
Pacific Coal Co		G. Wrighton, 34 Wall				
Peekskill Iron Co		W. Murdock, 7 Nassau				
Pennsylvania Coal Co		C. H. Mead, 111 B'way	3,200,000	50 00		
Richmond Iron Co		C. H. Smith, 165 B'way	1,000,000			
Scotia Coal Co		I. N. Soper, 42 B'way	2,500,000			
Spring Mt. Coal		C. Runyon, 111 B'way	1,250,000			
Springfield & D'p Run C.		E. D. Webb, 77 Cedar	600,000			
Stout Coal Co		G. S. Comstock, 111 B'way	500,000			
Susquehanna & Wyoming		E. Potter, 40 B'way	1,000,000			
Tannerdale Coal		I. T. Ludlaw, 71 B'way	250,000			
Wash. Mutual Coal		M. C. Baker, 117 B'way	420,000			
West Point Iron Co		R. C. Brock, 110 B'way	500,000			
Wilkesbarre C. & I. Co		W. H. Tillinghast, 80 Br'y	3,400,000			
Wyoming Val. Coal Co		E. Potter, 40 B'way	1,000,000			

COPPER AND LEAD COMPANIES.	SITUATION OF MINE.	SECRETARY AND PLACE OF BUSINESS.	CAPITAL.	PAR VALUE.	OFF'R'D.	ASKED.
Anita Copper	California	J. A. Ferguson, 8 Wall				
Corinth Copper	Corinth, Vermont	S. H. Howard, 191 B'way	$500,000	25 00		
Davidson Copper					3	
Eagle Harbor Copper	Michigan	W. H. Smith, 43 Ex. Place	500,000	25 00		
Evergreen Bluff Copoer	Michigan	F. W. Caper, 44 Ex. Place	500,000	25 00		
Globe Copper		R. K. Rickard, 19 Nassau	200,000			
Grand Portage Copper Co		A. S. Kellogg, 22 Pine	500,000			
Guymard Lead		Samuel Vernor, 38 Pine				
Hilton Copper		W. H. Smith, 43 Ex. Place	500,000			
Hope Copper		J. W. Davis, 19 Nassau	500,000			
Hudson River Copper	New York	T. Clarkson, 22 William	1,500,000			
Indiana Copper Co		J. M. Mills, 25 Nassau	500,000			
Isle Royale Copper	Michigan	F. W. Caper, 44 Ex. Place	1,000,000			
Keweenaw Copper	Michigan	F. W. Caper, 44 Ex. Place	500,000			
Lake Superi'r Silver Lead	Michigan	A. S. Kellogg, 22 Pine	1,000,000			
Omiga Copper	Michigan	S. Cooper, 7 Pine	500,000			
Ridge Copper	Michigan	J. L. Gardiner, Jr., 43 Ex. P.	500,000			
Rockland Copper	Michigan	A. Fullerton, 71 B'way	500,000			
St. Joseph Lead	Michigan	J. W. Jones, 6 Broad st,	1,000,000			
St. Marguret Copper		E. P. Sutton, 43 Pine	250,000			
Schoolcraft Copper		R. Walsh, 22 William	500,000			
Superior Copper	Michigan	A. Fullerton, 71 B'way	500,000			
Union Copper		A. S. Kellogg, 22 Pine	500,000			
Vermont Copper	Vermont	J. C. Ely, 191 B'way	500,000			
Wallkill Lead		S. M. Pond, 70 B'way			6	

MISCELLANEOUS.	SITUATION OF MINE.	SECRETARY AND PLACE OF BUSINESS.	CAPITAL.	PAR VALUE.	OFF'R'D.	ASKED.
American Zinc Co		W. E. Lawton, 19 Cliff	$1,000,000			
Bigelow Blue Stone Co		H. Bogardus, 14 Pine				
Quicksilver					13	14
Covill B. L. M. & M'f. Co		C. R. Bostwick, 302 Pearl	250,000			
Manhattan Marble		H. K. Gates, 70 B'way	300,000			
N. Jersey Zinc Co	New Jersey	A. H. Farlin, 61 Maiden L'e,	1,500,000			

Parabolic Truss Bridges.

THE superiority of iron over wood, as a material for railway and other bridges, is by this time so well established that only the cost of the more permanent and tenaceous material prevents its universal employment. The high price of iron renders it, therefore, a matter of direct pecuniary importance as well as scientific interest, to distribute the material of a bridge in such a way as to secure a maximum strength for the whole structure, or, in other words, to make those parts the strongest which are subjected to the heaviest strain. This is less important when wood is used, as in that case the engineer has only to assure himself that every part is abundantly supported, and may well afford to make his work doubly secure by introducing a comparatively inexpensive excess of material, even where it is not necessary. The maxim that a bridge is no stronger than its weakest part, is indeed true; but the test of strength is a relative one, depending for each point of the whole structure upon the amount and direction of possible strain. In following out this principle, engineers have wisely endeavored to distribute burdens also, in order to attain as far as possible a constant, equal strain upon all parts of a bridge, and to resolve this weight into pressures at the extremities of the span, which can be received by solid piers. The steady weight of the bridge itself, and the moving weight of trains, wagons, or passengers, must both be taken into account; and the desired end is more or less completely effected by the use of arches or trusses. Trestles and piles may be here left out of account. In many cases they cannot be employed at all; and when their use is possible and advisable they must be considered as so many independent structures, each one of which depends upon its own stability, unless, indeed, a complicated system of trestles is employed, involving, one might almost say, the principle of the truss.



HERTHEL'S PATENT PARABOLIC IRON TRUSS BRIDGE.

The accompanying illustration presents a general sketch of the plan, elevation and cross-section of a railway bridge of 120 feet span, on the plan of the parabolic truss, patented by Mr. GEORGE F. HERTHEL, Jr., C. E., of St. Louis. This bridge combines the principle of the arch with that of the truss, in such a manner as to secure a great rigidity and stability throughout. It will be seen by the engineer at a glance, that both the direction and the amount of support given to each part corresponds to the direction and amount of strain. By assuming the presence of a heavy weight (say a train of cars) at any given point on the bridge, and following the directions of the various supports of that point, it will be seen how nicely and evenly the burden is distributed. An analytical discussion of the merits of this plan would be here out of place; it is our object only to call attention to it, and furnish such a drawing as will enable any engineer to make the requisite mathematical investigation for himself. It should be added, to render the accompanying sketches complete as data for such a purpose, that the oblique stays are of different sizes, according to the load they have to bear. Thus, beginning in the middle and reckoning both ways, the pair of stays diverging downward from the centre of the arch are $\frac{7}{8}$ of an inch in diameter; the two pairs from the two next points on either side, the stays descending towards the centre are $1\frac{1}{8}$ inches, and towards the piers $1\frac{1}{4}$ inches in diameter; from the two points next outside of these all the stays are $1\frac{1}{4}$ inches; from the two points of the arch which stand second from the piers, the stays towards the centre are $1\frac{1}{4}$ inches, and towards the piers 1 inch; and finally, the two points next to the piers have each two stays toward the centre, of which the upper have a diameter of $1\frac{3}{8}$ inches, and the lower $1\frac{1}{8}$ inches.

The house of HAWKINS, HERTHEL & BURRALL, contractors and builders, Springfield Mass., manufactures these bridges, and also those on the plan of the favorite HOWE truss, and HERTHEL'S patent rectangular iron truss, together with iron and timber turntables and roofs, custom castings, corrugated iron roofing, siding, shutters and doors, bridge bolts and building irons of all kinds.

Rock-Drilling Machines.

WE have received from the author a copy of the German edition of a most interesting and valuable work on this subject, originally published in Swedish by F. M. STAPFF, Ph. D., an engineer well-known in the mining and metallurgical world, and for a series of years instructor in the school of mines at Fahlun, Sweden. Dr. STAPFF has already distinguished himself by numerous valuable contributions to the literature of his profession, among which perhaps the present is the most generally interesting, important and well-timed.

The work commences with a critical investigation and discussion of the mechanical principles and the practical efficiency of the usual methods of hand-drilling. The mathematical demonstration is the most thorough and complete that has appeared on this subject; and the author arrives at the following conclusions: (1) that two-thirds of the total cost of drilling and blasting, by hand, in the usual methods, is expended (in European practice) upon the drilling of holes; (2) that the usual effect produced in hand-drilling amounts to about four and a half per cent. of the power expended; and (3) that this disproportion cannot be done away, except by the substitute of machine-drills, which will be practically economical in proportion as their actual effectiveness approaches the theoretical requirements of their construction.

Continuing this discussion, Dr. STAPFF considers the different varieties of machine-drills thus far introduced in practice, and applies to each the stem test of analysis and comparison, scrutinizing and pronouncing judgment upon their mechanical construction and their practical efficiency. The operations of the machines used in the Mount Cenis tunnel are treated at length and in detail; and deserved attention is given to the apparatus of SCHUMAN, for mining work, which may be considered as the earliest of this class, and which, like HOWE'S sewing-machine, has given rise to numerous inventions of a similar character. The principal motor employed in drilling-machines is compressed air. One of the principal drawbacks connected with their use seems to be the loss of working time involved in erecting the frames or carriages. The Burleigh drill, recently exhibited at the Fair of the American Institute, had a frame which could certainly be erected with ease and speed; but its support upon three legs did not seem to us particularly stable, even on the level, firm floor of the Fair; and would please us still less upon the irregular floor of a tunnel, covered with fragments of rock or heaps of earth. The Burleigh drill is an excellent machine, however; and this criticism only applies to its use in small drifts. For railway tunnels, or excavations of a large section, this drill, like most others, is provided with a heavy carriage, which is pushed forward on a tram-way as the work advances. The construction, for single drills, in mining drifts or stopes of small dimensions, of a frame or carriage which will be at once movable and immovable—easily handled by the workman, and not easily displaced by the work—is a desideratum.

At the close of his work, Dr. STAPFF devotes considerable attention to the merits of the revolving drill, set with black diamonds. This machine has achieved a high reputation in this country; and its gross effectiveness is certainly very great. We have no material at hand for comparing its work with its running cost; but the fact that it has successfully drilled out cores of solid rock to the depth of several hundred feet is strong evidence in its favor. Dr. STAPFF, summing up his discussion of European data, says that LESCHOT'S diamond drill can only yield economical gains, when it is attached to a cheaper motor than hand-power, or so arranged that the cog and screw gearing shall not destroy too much useful effect. The running cost of the drill, aside from the diamonds, is set down as inconsiderable. With regard to the latter, the author estimates their cost to be about seven cents gold per yard of depth drilled. The demand for black diamonds has already raised their price from six francs per carat to twelve francs and more.

After considering various other systems, Dr. STAPFF concludes with a recommendation of revolving steel-headed drills, for which, judging from the results of experiment, he predicts future usefulness and popularity. The whole of the work is proof that its author is master of this department of applied science. We wish it might be translated into English, and reproduced, together with the accompanying plates, for the American engineering public. It gives us great pleasure to learn that Dr. STAPFF, who is now visiting this country, proposes to remain long enough to study, from a professional stand-point, our methods and apparatus; and we hope that so accomplished a mining engineer and metallurgist will be induced to take up his permanent residence among us, and lend his aid in the development of our great natural and industrial resources.

The Lime Quarries of Maine.

THE great lime quarries at Rockland, Maine, are described by a correspondent as follows:

"Formerly any person with but little capital could quarry out his own rock, haul it to the kiln, which he had built at a cheap rate, or hire one of his neighbor, and burn his lime and sell it for what he could get. But now all this is changed. The lime quarries are owned by men of wealth, the old-fashioned kiln has given way to the patent perpetual kiln, and everything is done on a scale which demands capital.

"The kilns are situated on the shore of a peninsula. By describing one we give an idea of them all. The kiln is located at the foot of a bank near the head of a wharf. It is built about eighteen feet square and thirty feet in height. The walls are of thick granite, and the inside is lined with fire-brick. Teams haul the lime rock from the bank to the top of the kiln, down which the rock is thrown. The kiln is narrower as you descend. One of these kilns will hold from one hundred and fifty to two hundred casks of lime. The time required for burning the lime is from seven to eight hours. The rock is divided into hard and soft; the former will yield one hundred and ten casks a day, and the latter ninety. The kiln is drawn off four times a day. The lime swells a great deal in the kiln, which prevents the unburned portions from falling down. When the lower portion is sufficiently burned, long iron rods are run into the furnace, and the burned portions fall to the bottom. This is shovelled out with long-handled shovels on the ground, in large lumps of a glowing red color, when it is broken up, sorted out and packed into casks, and rolled to the rear of the building, where a vessel lies ready to receive it. The vessel usually brings into port a load of wood and departs with a a cargo of lime. Immense sheds, covering all the kilns and wood, are conspicuous everywhere. For two kilns a building covers about seventeen thousand square feet. Several companies have commenced using coal the past summer, which bids fair to revolutionize the whole system of burning lime. At present about one cord of wood to two tons of bituminous coal are used. It requires about four and one-half cords of wood to one hundred casks of lime. One firm is experimenting with pure coal, with good prospects of success."

THE ENGINEERING AND MINING JOURNAL.

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ROSSITER W. RAYMOND, Ph. D., Editor.

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Rails, Steel and Steel-Topped.

THE Institution of Civil Engineers in England last year declared, after full discussion, the following opinion as to the superior economy of steel rails:—"There can be no doubt as to the expediency of employing steel rails, even on railways where the traffic is light; but, of course, the heavier the traffic, the greater will be the economy or substituting steel for iron."

We have shown on former occasions that this question is one of interest on the first cost; and in view of this fact, it seems to us that the verdict quoted is too sweeping. There are railways, the traffic on which is so light as to render neither steel nor iron, but wood, the most economical material. Until steel rails cost no more than iron, there must continue to be cases in which the use of iron will prove the more economical. This criticism apart, however, there is no doubt that the superiority of steel is established; and the progress which has been made in the manufacture of cheap steel is fast putting the question beyond dispute, even on grounds of economy. The report of the N. Y. State Engineer and Surveyor estimates that by the end of 1869 there will be laid in the United States, in round numbers, one hundred and ten thousand tons of steel rails, equal to eleven hundred miles of steel road, of more than fifty different lines. These rails are partly of American, principally of English, and, to a very small extent, of Prussian manufacture.

The American works engaged in this manufacture are:

	Annual Capacity.
Griswold & Co., Troy, N. Y.	15,000 to 20,000 tons.
Pennsylvania Co., Harrisburg, Pa.	20,000 "
Cleveland Rolling Mill Co.	15,000 to 20,000 "
Freedom Works, Lewistown, Pa.	10,000 to 12,000 "
Cambria Iron Co., Johnstown, Pa.	20,000 "

These works are not now all running up to their full capacity. In fact, Messrs. GRISWOLD & Co. have not yet entirely restored their works, which were burned in October, 1868; and the works of the Cambria Co. are not yet completed. Next year, however, it may be expected that these five establishments will furnish to American railways at least 80,000 tons of steel rails.

The English steel rails laid in this country are made by four companies: GUEST & Co., of the Dowlais Works in South Wales; the Barrow Hematite Steel Company; CAMMELL; and JOHN BROWN & Co. These establishments have furnished through their American agencies up to this time, about 98,000 tons of steel rails, of excellent quality. An article in the N. Y. *Tribune*, to which we are indebted for the foregoing figures, relates that the President of the New York and New Haven Railway Company instituted a test last winter at Bridgeport, in which two iron rails were placed 2½ feet apart on a solid wooden platform. On these bearings a first-class iron rail, made at Worcester, was laid and shivered into fine pieces by the 1,500-pound weight of a pile-driver falling on it from a height of 20 feet. The same weight was then dropped from a height of 34 feet on each of the steel rails, and neither of them was even cracked. In view of the result of this experiment, the New York and New Haven Company resolved and openly proclaimed that they would hereafter buy the steel rail that could be had for the least money, inasmuch as they were fully convinced that any one of the rails tested would be abundantly strong and durable for all practical purposes.

The same writer asserts that, "despite the great strides in advance which we are making this year in the laying of steel rails, we are still behind many European countries in this respect. France, Belgium, Germany, and Holland have already laid them extensively, and even Russia has over 70,000 tons engaged for the present year. Immense quantities are also going to the East Indies, the great Indian Peninsula Railway alone having ordered 32,000 tons within the last two years. This tardiness on the part of the United States is owing largely to the higher rates of money in this country. The price of a ton of steel rails at the mill in England is about £12 in gold, which amounts, with the 45 per cent. duty and the cost of transportation, to £19 in gold, equal at the recent rates to about $130 in currency; whereas good iron rails may be had for $85, and poor ones for considerably less. In fact, the failure of many roads to introduce steel is not the worst of it. They will not even use good iron."

Meanwhile, there is a strong movement in favor of the employment of iron rails with caps, either of solid cast steel, or of puddled steel, welded to the rail. It is said that these rails can be furnished more cheaply than those wholly of steel, and there are those who claim for them even a superiority, by virtue of the combination of the hard wearing surface with the tough bearing mass below. A lively debate on this subject has sprung up; and the arguments *pro* and *con.* will be found epitomized in another part of this JOURNAL. We wait, with the rest of the world, for the calm and irreversible decision of more prolonged experience; but we are inclined to believe that new improvements in the manufacture of steel will soon put an end to the discussion.

Labor Unions.

THERE is no doubt that protective and benevolent unions of workmen are as proper and justifiable as combinations of capitalists and employers. Association for lawful ends is the right of all citizens in a free country. Nor do we believe the government can interfere with such organizations, so long as they do not break the laws, disturb the peace, or tyrannically interfere with the freedom of individuals. We go further, and say that laws which forbid peaceful organizations of this kind, merely on the ground that they are intended to raise artificially the rate of wages or the prices of commodities, are false in principle, and mischievous in practice, and ought to be repealed. Speculation is an evil, whether it be speculation in land, labor, grain, or gold; yet it is not an unmitigated evil; and to stop it by law (if that were possible) would be to choke the life out of industry and trade. Speculation is a result of hope, and hope is the motive power of progress. When the activity of men is so fettered that speculation becomes impossible, they labor, like brutes, for their daily sustenance and shelter only. Now there is an element of speculation in all attempts to force up the prices of labor or goods above their natural position. Such attempts are sure, in the end, to bring failure and disaster; political economy has its laws, which cannot be violated with impunity; but sometimes the artificial arrangements of society throw the penalty upon innocent parties, and the culprits escape with their unjust gains.

On the other hand, there is such a thing (especially with regard to labor) as an unnatural depression of prices; and, in such a case, the combination of laborers to restore the fair balance is wholesome and right. In every instance of a "strike," this principle is virtually acknowledged. Workmen do not strike unless they think they have grievances; and they invariably attempt to secure the support of public opinion. The difficulty is, that neither employers on the one hand nor laborers on the other, are impartial judges of what should be considered a fair arrangement. To attempt to step in between them, however, by legislative enactment, is only to put the matter in the the worst possible shape.

The law should sternly punish all attempts of Unions to coerce men to work for high wages, when they are willing to accept lower wages. It should protect individual liberty, and nothing more. If men commit acts of folly, not transgressing this limit, the only corrective is the force of public opinion, and the pain which they cause to themselves and others.

Lord STANLEY, in a recent speech at the opening of some new works in Liverpool, put this matter in sensible, clear words. He said:

"If there are two things which more than any other Englishmen in all ranks of life thoroughly understand and cordially sympathize with, those two things are fair play and individual freedom. And in a country like this, where public opinion governs, I will venture to say no institution has a chance of permanently holding its own which is even remotely suspected of encouraging and sanctioning or tolerating interference with the free action of those who don't belong to it. The doctrine that the end sanctions the means, the theory that men are to be unlawfully coerced, to their own advantage even, has never come to good yet, and never will. The right to combine is undisputed, and equally so is the right of other men, if they think fit, to stand aloof from combination. Any attempt to do by pressure what ought to be done only by fair argument is, in my opinion, not only a wrong, but a fatal and suicidal policy. I know it is sometimes said, 'We are getting, or trying to get, advantage for the whole trade, and it is not fair that those who had no part of the cost or trouble should reap the benefit.' Well, to that my answer is, 'If what you are doing is for your own interest and for that of your fellow-workmen, be patient, and in time those who now stand aloof will join you.' In the meantime, 999 men out of 1,000 have no more right to control the single dissentient than he would have were it in his power to control them. There is hardly a despotism since the world began than has not founded itself on the same plea that it would carry into effect more surely than free citizens do the recognized will of the majority. To refuse to recognize the freedom of your neighbors, is the first step towards losing your own."

With this we cordially agree; and this principle being acknowledged, the greatest evil of Labor Unions is at once removed, leaving only such as will correct themselves. With the progress of intelligence among workingmen, we may expect them to find out that such devices as eight-hour laws, uniform wages for all members of a trade, without regard to the quality of work, etc., are so many restrictions on the good workman, and rewards for the shiftless, unskillful, and idle. A man of industry, honesty and aptitude for his business, will get along better without the aid of those contrivances, which tend to keep him forever in the common herd, and prevent him from becoming himself an employer. If this is true, it will be sooner or later made apparent. Legislation, in this as in many other instances, is powerless to supply the lack of wisdom.

Colorado Stamp Mills.

As a general rule, the speed of the stamps in Colorado mills is remarkably low. Instances to the contrary are rare exceptions; and whenever the mill-men are enlightened or condescending enough to give any reasons for the course they pursue, their reasons are based, either on local experience or on a sweeping theory that high speeds "won't do" for pyritic ores. We take leave to doubt the correctness of this theory, and to suggest that an increase of speed in most of the Colorado mills would result in increased profits. It is true, that the additional amount of water required to effect a more rapid discharge involves an additional risk of losing gold; but this might be counteracted by proper apparatus for amalgamation. If battery amalgamation and copper plates comprise the whole process of saving gold in a mill, then the slower it runs, the better; and possibly, in some cases, it would do best of all to stand still. The principal cost of working in quartz-mills is the cost of the mechanical crushing of the quartz, represented by fuel, labor in the mill, interest on capital, wear and tear of machinery, etc. Now all these items are larger *per ton* when the stamps run slowly, than when their speed is increased; so that, even if increased speed involved increased loss of gold, there might be a gain of so much per ton in expenses, as to cover the loss. But the assertion that rapid running involves greater loss lacks decisive proof. Taking a mill, built and calculated to run at eighteen to twenty drops per minute, (and we have seen them in process of construction on still lower plans) and simply running it at double speed, without changing it in other respects, is no way to decide the point. Such an experiment proves little or nothing.

A Colorado paper complains of a correspondent of this JOURNAL, for giving the impression that "the mill-men of Colorado are following some stupid fashion blindly." This is just what we think they are doing, as a class. Nor do we think the matter is bettered by the course of those journalists who (to attract capitalists from abroad) perpetually descant upon the great profits which will result when "our present crude and imperfect processes" have been superseded by the patent furnace or new chemical discovery of this or that inventor, while (to flatter subscribers at home) they scout and ridicule all well-meant suggestions for the actual improvement of existing methods. The present amalgamation-process is not likely to be superseded in Colorado, but it is likely to be improved. The newspapers of that Territory could greatly assist in this desirable work by opening their columns to intelligent discussions of the mechanical, metallurgical and economical aspects of the question.

Southern Salt.

THEY are beginning to work again the Petite Anse salt mines in Louisiana; and lately a shaft has been sunk to the depth of seventy-nine feet, with two lateral chambers, from which forty or fifty tons of salt are taken every day. Petite Anse is a small island in the middle of a bayou, and the island is believed to be one solid lump of salt. It was accidentally and opportunely discovered during the war, when the whole South was suffering for salt, and while the island was in Confederate hands, large supplies were taken from this mine. The works were subsequently destroyed by a detachment of General Banks's army, and it is only lately that the mining has been resumed. A new crushing mill has been erected, and is now at work. The deposits contain nearly 93 per cent. of pure salt—against 98.88 per cent. in Turk's Island salt, and it is sold in sacks at the mine at the rate of $18 per ton. The Texas meat packers are giving this salt a trial this season.

The American Institute of Architects.

BY virtue of an arrangement, for some time under consideration, and now happily consummated, the ENGINEERING AND MINING JOURNAL will hereafter be the recognized official organ of this well-known, prosperous, and active society, and the principal channel of its communications to the public. The various papers on subjects connected with building, which are from time to time read before the Institute, will be published in our columns. At the same time, the publications of the Institute in more permanent form will be constantly for sale at this office; and we take pleasure in calling the attention of our readers to the list given in our advertising columns, from which the great interest and value of the works already issued may readily be perceived.

The Colors of Foliage.

THE London *Athenæum* says:—"Experiments has confirmed the conclusion of an American scientist that leaves turn red, at the end of the season, through the action of an acid, since one of the elements producing the green color must be a vegetable blue. Autumnal leaves placed under a receiver, with the vapor of ammonia, in nearly every instance lost the red color and renewed their green. In some, such as the sassafras, blackberry, and maple, the change was rapid, and could be watched by the eye, while others, particularly certain oaks, turned gradually brown, without showing any appearance of green.

Mercury Mines of Alamaden.

M. JOUGLET says that mercury, as metal, has been known from the most remote antiquity—that there have been mines worked for mercury ore in Asia Minor in the time of Xenophon; the mines of Alamaden, Spain, is yet the largest source of mercury for Europe. The cost of 100 kilos. of the ore is, everything included, only 16 francs and 10 centimes; but it yields, as this author says, by unsuitable management, only 6·9 per cent. of mercury, 100 kilos. of which cost, on the spot, 141 francs and 30 centimes; but at Sevilla the price is already 177 francs and 80 centimes, in consequence of cost of transport and the iron vessels in which the metal is carried. The average quantity of mercury produced annually amounts to about 15¼ tons by weight.

Georgia Slate.

AN extensive slate quarry has recently been discovered on the Coosawattee river, Georgia. The quarry, which yields roofing slate, is seven hundred yards wide and about half a mile long. On the east bank of the river there is a solid bluff of slate twenty-five feet high above the water. The mineral wealth of the South is becoming better known since the attention of the citizens has been directed to other subjects than raising cotton.

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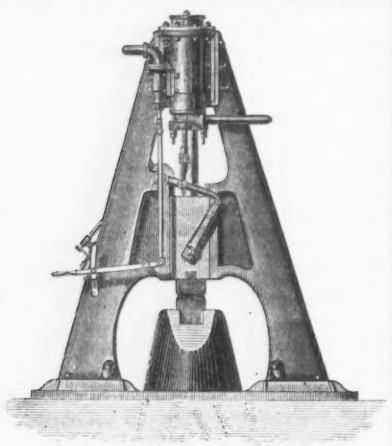

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OFFICE OF THE MANHATTAN SILVER MINING COMPANY OF NEVADA, No. 113 Broadway, Room 39, NEW YORK, November 9th, 1869.—The Board of Trustees of the Manhattan Silver Mining Company of Nevada, have this day declared a dividend of FIVE (5) PER CENT. on the capital stock of the Company, payable in GOLD COIN at this office, on and after the 15th instant. The transfer books will be closed on the 11th instant, and remain closed until the 16th instant.
M. L. OGDEN,
nov. 16:1t Secretary.

OFFICE OF THE WILKESBARRE COAL AND IRON COMPANY, 80 BROADWAY, NEW YORK, October 20, 1869.
A Dividend of FIVE PER CENT., free from Government tax, payable on and after November 15th, 1869, has this day been declared. The books of the Company for the transfer of stock will be closed from November 1st to 15th inclusive. By order of the Board of Directors.
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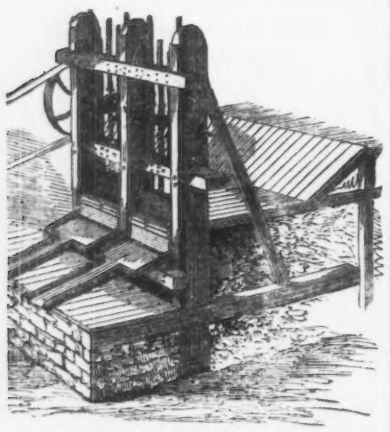

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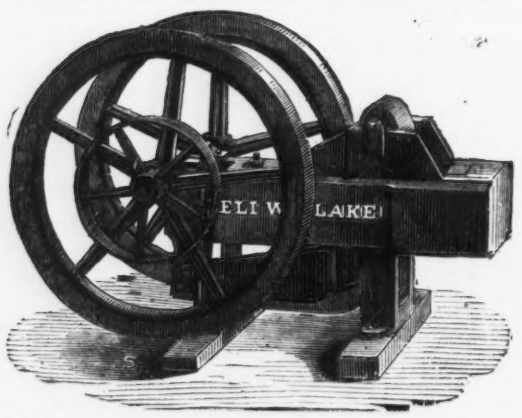

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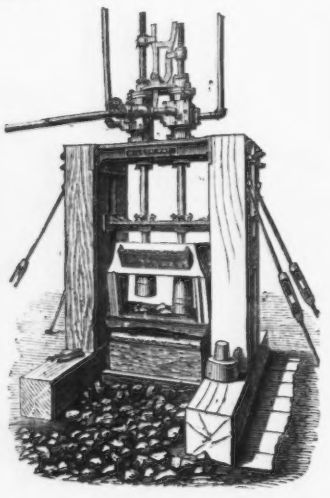

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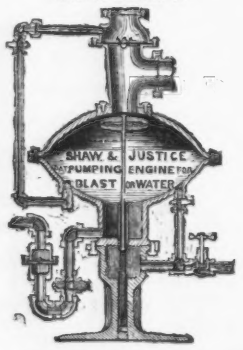

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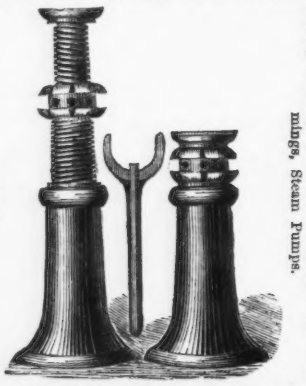

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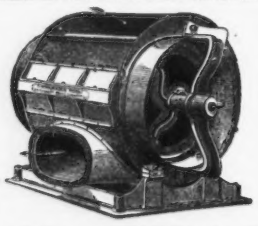

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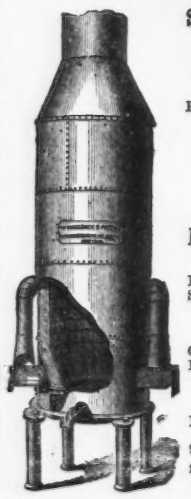

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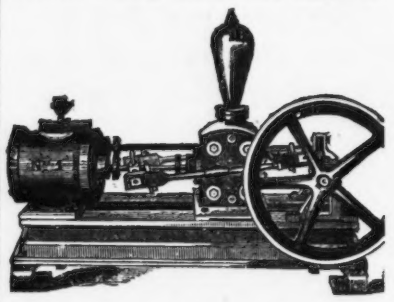

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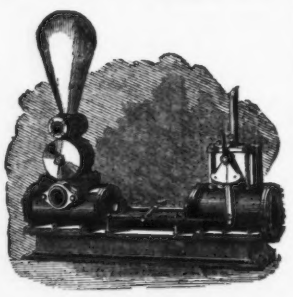

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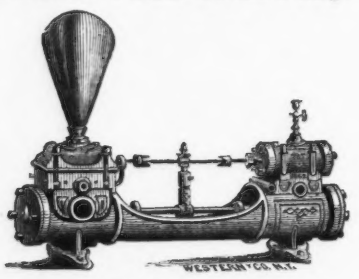

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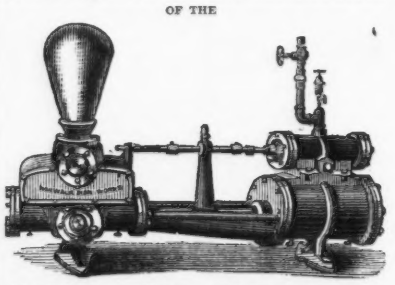

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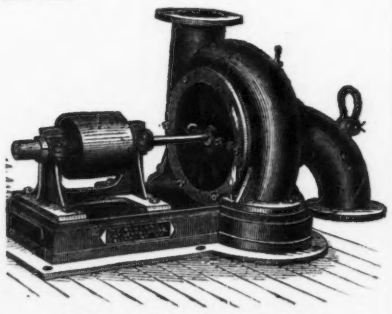

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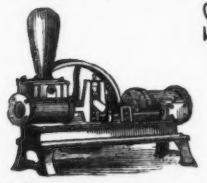

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Steam Pumping Engines, Single and Duplex, Worthington's Patent, for all purposes, such as Water Works Engines, Condensing or Non-condensing; Air and Circulating Pumps, for Marine Engines; Blowing Engines; Vacuum Pumps, Stationary and Portable Steam Fire Engines; Boiler Feed Pumps, Wrecking Pumps,

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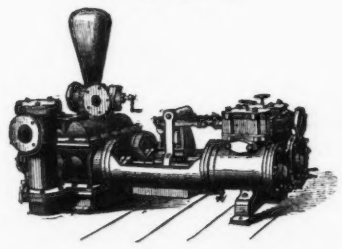

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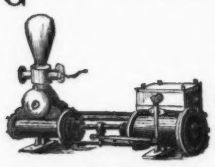

Steam Pumps, Vacuum Pumps, Steam Engines, Vacuum Pans,

And all the various connections. For sale at the STEAM PUMP WORKS, 26, 28 and 30 First street, Williamsburgh, N. Y.

sep14-6m

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CORLISS STEAM ENGINE COMPANY.,
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GEORGE H. CORLISS, PRESIDENT.
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MANUFACTURERS OF

STATIONARY AND MARINE ENGINES AND BOILERS.

Engines ranging from 15 h. p. to 1,000 h. p.,

FURNISHED ON SHORT NOTICE.

These Engines, manufactured under the several patents granted GEO. H. CORLISS, secure a perfectly uniform motion, under all variations of resistance, and SAVE THEIR COST IN FUEL IN FROM 3 to 5 years. Our facilities and capacity are unsurpassed by any establishment in our line. Sept 28 tf

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COAL, IRON, AND OIL. — THIS GREAT work on our mineral resources, by DADDOW & BANNAN, we learn is the only work published in the United States containing a description of the Ventilating by the Fan, which is the safest and cheapest mode of ventilation. This work contains 808 pages, octavo, and upwards of 200 maps and engravings. The London *Mining Journal*, good authority, says that they have no single volume equal to it in England. The "Avondale horror" renders such a work at this time very valuable. It is for sale at this office, Price $7 50. Sent post-paid by mail on receipt of price. sept 28-tf

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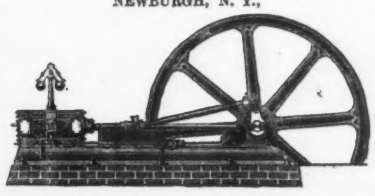

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WITH

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MARINE ENGINES AND BOILERS of all descriptions, HIGH AND LOW PRESSURE;

PUMPING ENGINES.

for WATER WORKS, warranted to give the LARGEST DUTY with the smallest consumption of fuel.

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with suitable Steam Engines, Boilers, and attendant Machinery, Vacuum Pans, Coolers, Tanks, and Refining Machinery.

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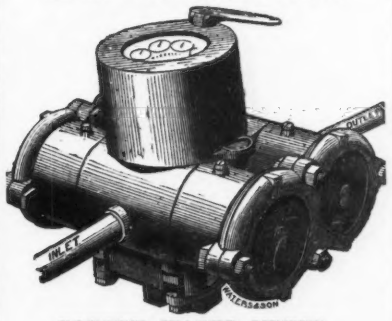
MACHINISTS' SUPPLIES.

H. R. WORTHINGTON'S



PATENT WATER-METER.

This Meter is also Used for the Measurement of Oil.

IT COMBINES

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with such ease and certainty of motion as to offer no appreciable obstructions to the flow of water in the pipes to which it is connected, as it runs and registers upon three inches head, or when delivering the smallest stream. These qualities, with its low cost, have caused its extensive adoption by corporations and individuals, in many of our larger cities.

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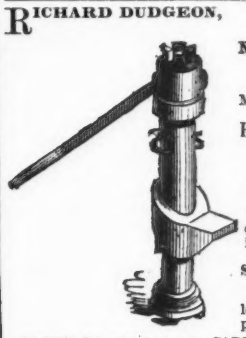

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Communications by letter will receive prompt attention.

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MERRICK & SONS'

Southwark Foundry.

No. 430 WASHINGTON AVENUE, PHILADELPHIA.

William Wright's Patent Variable Cut-Off Steam Engine, regulated by the Governor. Merrick's Safety Hoisting Machine, Patented June, 1868. David Joy's Patent Valveless Steam Hammer. D. M. Weston's Patent Self-Centering, Self-Balancing Centrifugal Sugar Draining Machine, and Hydro Extractor for Cotton and Woolen Manufacturers. nov15-1y

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PATENT

Engines, Boilers, Pumps, Hoisters,

OSCILLATING ENGINES, run at great speed. Sizes 1-2 to 250 Horse-Power.

SMOKE-BURNING AND SUPER-HEATING BOILERS are economical and Safe.

CENTRIFUGAL PUMPS, pass Sand, Coal, Corn, Gravel, etc., without injury. Capacity 90 to 40,000 gallons per minute.

HOISTING MACHINES, run without noise; speed changed or reversed instantaneously.

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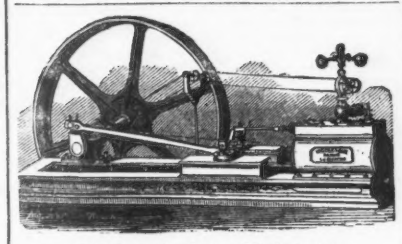

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MACHINERY MERCHANTS, ENGINEERS, AND MACHINISTS,

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Lathes, Planers, Drills, Chucks, etc. Iron and Brass Castings. Judson & Snow's Patent Governors constantly on hand.

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T. S. POST & Co., Benham, Texas, say: "Since using Winans' Powder, we save ONE cord of wood per day (one-half our fuel), and have better steam, and would not be without the article for ten times its cost."

The Cleveland (Ohio) Paper Mills removed scale 22 inches long by 9 wide and 1¼ inch thick.

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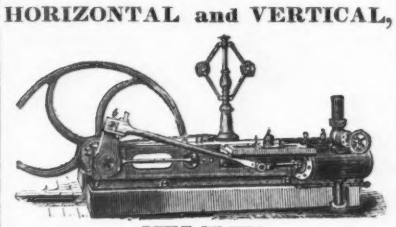
ENGINES, IRON WORK, ETC.

RIDER'S PATENT CUT-OFF ENGINES,

HORIZONTAL and VERTICAL,



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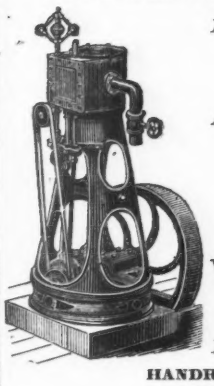
NEW YORK CITY.



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Also, BOILERS, TANKS, and CASTINGS, of all descriptions. nov 2:1y

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BREAST AND TURBINE

WATER WHEELS,

Regulators, Elevators, Shafting, Gearing, Pulleys, Gate Screws for Hoisting Gates, Woodworth's Planing Machines, Grist Mills, etc., etc.

Patent Rotary Fulling Mills,

Hammer Falling Stocks, Fulling Mills, Dusters, Washer for Rinsing Cloths, Dolly Washers for Hosiery Goods, Wool Washers for Washing Wool, Gigs, Dye Tubs, Blue Vats, and Steam Boxes.

Also Iron Founders. Every description of Casting furnished at short notice. All Machines and Castings furnished at this establishment warranted.

june5-tf-q ORANGE, MASS.

STEAM BOILERS.

THE STEAM GENERATOR

Manufacturing Company of Penn.

This Company is now prepared to furnish

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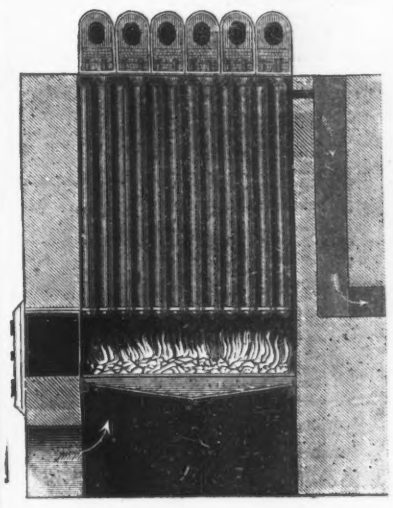

Patent Improved Steam Generator,

Of any power required, upon two weeks' notice. They have been introduced in this city and thoroughly tested, with most satisfactory results, and are sold under Guarantee of Absolute

Safety from Destructive Explosion.

They are cheaper in first cost and in expense of erection, more economical in fuel, durable and convenient in use, than any other apparatus for generating steam. For Mining purposes it is unequalled, owing to the facility with which it can be transported and erected.

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NELSON J. NICKERSON, President.

EDWARD H. GRAHAM, Sec. and Treas. sep14-1y

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SAFETY BOILER.

Over 100 sold—tested to 300 lbs., no large sheet-iron shell to explode. Economical and durable. All sizes on hand. Also, Steam Engines, Steam Pumps, etc. Send for pamphlets and price lists.

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WORCESTER STEAM BOILER WORKS, manufacturers of

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N. B.—Boilers inspected and repaired in the best manner and at short notice.

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CIRCULAR SAWS WITH EMERSON'S PATENT MOVEABLE TEETH.

These Saws are meeting with unprecedented success, and their great superiority over every other kind, both as to efficiency and economy, is now fully established

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EMERSON'S PATENT PERFORATED CIRCULAR AND LONG SAWS,

(All Gumming avoided,) and

EMERSON'S PATENT ADJUSTABLE SWAGE,

for Spreading, Sharpening, and Shaping the teeth of all Saws. Price, $5. Manufactured by the

AMERICAN SAW COMPANY

Office No. 2 Jacob St., near Ferry St., New York.
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DANIELS' & WOODWORTH PLANING MACHINES MATCHING, SASH AND MOULDING, TENONING, MORTISING, BORING, SHAPING, VERTICAL AND CIRCULAR RE-SAWING MACHINES.

Saw Mills, Saw Arbors, Scroll Saws; Railway, Cut-Off, and Rip-Saw Machines; Spoke and Wood Turning Lathes, and various other kinds of Wood-working Machinery.

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ROLLSTONE MACHINE WORKS, Manufacturers of

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Matching Machines, Moulding Machines, Saw Benches, Chair Lathes, Self-Oiling Pulleys, etc.

june5-tf FITCHBURG, MASS.

RAILROADS.

LEHIGH & SUSQUEHANNA RAILROAD.
(LEHIGH COAL AND NAVIGATION CO.)

Summer Arrangement.

On and after Monday, July 12, 1869, Passenger Trains on the Lehigh & Susquehanna Railroad will run as follows:

DOWN TRAINS.

	No. 1. A.M.	No. 3. A.M.	No. 5 P.M.	No 7. P.M.
Leave Green Ridge	9:05	7:00	1:00	5:15
Scranton	9:10	7:05	1:05	5:20
Pittston	9:36	7:35	1:35	5:52
Wilkesbarre	10:00	8:00	2:00	6:17
White Haven	11:23	A.M.	P.M.	P.M.
				No. 9.
Mauch Chunk	12:00			A.M.
	1:03			6:50
Catasauqua	2:01			8:04
Allentown	2:10			8:15
Bethlehem	2:20			8:30
Easton	2:48			9:05
Phillipsburg	2:52			9:10
Philadelphia	4:45			A.M.
Arrive New York	6:30 C.R.R.			
	9:40 M. & E.R.R.			
	P.M.			

UP OR NORTHWARD TRAINS:

	No. 2. P.M.	No. 10 A.M.
Leave New York	9:00 C. R. R.	
	8:30 M. & E. R.R.	
Philadelphia	9:45	
Phillipsburg	11:50	7:00
Easton	11:55	7:04
Bethlehem	12:23	7:36
Allentown	12:36	7:50
Catasauqua	12:53	8:04
Mauch Chunk	2:05	9:20

	No. 4. A.M.	No. 6. P.M.	No. 8. P.M.
White Haven	3:23	P.M.	P.M.
Wilkesbarre	5:00	8:30	2:25 6:45
Pittston	5:25	8:55	2:50 7:10
Scranton	5:56	9:26	3:20 7:40
Arrive Green Ridge	6:00	9:30	3:25 7:45
	P.M.	A.M.	P.M. P.M.

Connections.

DOWN TRAIN No. 1, makes close connection at Penn Haven with Lehigh Valley Railroad, for Beaver Meadow, Hazleton and Mahanoy City.

DEL. & HUDSON CANAL CO., R.R.—Up trains Nos. 4 & 6, and down trains Nos. 1 and 7 connect at Green Ridge with trains on Delaware & Hudson Railroad, to and from Carbondale.

NORTH PENNA. R.R.—Down train No. 1, and up train No. 0 connects at Bethlehem with trains on North Pennsylvania R.R., arriving at Philadelphia at 4:45 P.M. Returning, leave Philadelphia for Scranton, Wilkesbarre and Mauch Chunk at 9:45 A.M.

LEHIGH & LACKAWANNA R.R.—Down train Nos. 1 and 0, and up train Nos. 2 and 0 connect at Bethlehem with Lehigh & Lackawanna R. R. for Bath and Chapman Quarries. Returning leaves Bath at 7:00 A.M.

MORRIS & ESSEX R. R.—Down train No. 1 and 0 connect at Easton with Morris & Essex Railroad for Newark and New York. Returning leave New York (Barclay street,) for Scranton, Wilkesbarre and Mauch Chunk at 8:00.

CENTRAL RAILROAD OF NEW JERSEY.—Down trains Nos. 1 and 9 connect at Phillipsburg with trains for New York. Returning, leave New York (foot of Liberty street,) for Scranton, Wilkesbarre and Mauch Chunk at 9:00 A. M.

BELVIDERE & DELAWARE R.R.—Down train No. 0 and up train No. 2 connect at Phillipsburg with Belvidere & Delaware Railroad to and from Trenton and Philadelphia.

MENDES COHEN,
Superintendent.

LEHIGH VALLEY RAILROAD.—ON AND

after June 1, 1869, trains on the Lehigh Valley Railroad will run as follows:

DOWN TRAINS.

	A.M	P.M.
Leave Tunkhannock	6.20	
L. & B. Junction	7.30	1.15
Pittston	7.40	1.25
Wilkesbarre	8.00	1.45
White Haven	9.25	3.08
Mauch Chunk	10.35	4.20
Allentown	11.43	5.50
Bethlehem	11.55	6.05
	P.M.	
Easton	12.25	6.35
Philadelphia	2.10	8.35
Arrive New York	3.50	9.00

UP TRAINS.

	P. M.	M.
Leave New York	6.50	12.00
		P. M.
Philadelphia	7.45	1.45
Easton	10.00	3.25
Bethlehem	10.30	4.00
Allentown	10.45	4.20
	M.	
Mauch Chunk	12.00	5.45
	P. M.	
White Haven	1.32	7.18
Wilkesbarre	2.50	8.35
Pittston	3.10	8.55
L. & B. Junction	3.20	9.05
Arrive Tunkhannock	4.30	

☞ No change of cars between Scranton and New York, or between Scranton and Philadelphia.

ROBERT H. SAYRE, Sup't and Eng.
H. STANLEY GOODWIN, Ass't Gen. Supt.
June 1, 1869.

DELAWARE, LACKAWANNA & WESTERN R. R.—Morris & Essex Division.

Summer Arrangement,

Commencing Monday, April 5, 1869, and running on the following time until further notice.

	L. and Express. A. M.	Scranton. Mail. A.M.	Scranton. Express. P. M.
Leave Easton	6.55	11.30	5.30
Washington	7.28	12.10	6.15
Hackettstown	7.48	12.36	6.45
Dover	8.30	1.24	7.30
Rockaway		1.34	
Morristown	9.00	2.00	8.00
Orange		2.50	8.50
Newark	9.50	3.00	9.00
Arrive New York	10.25	3 35	9.40
	A.M.	P. M.	P.M.

RETURNING.

	P. M.	A. M.	A.M.
Leave New York	4.00	7.00	8.30
Newark	4.40	9.05	7.40
Orange			7.53
Morristown	5.33	10.00	8.45
Rockaway			9.09
Dover	6.00		9.20
Hackettstown	6.42	11.05	10.08
Washington	7.02	11.25	10.33
Arrive Easton	7.35	11.57	11.10

Connections.

At Washington, with Delaware, Lackawanna & Western Railroad, for Water Gap, Stroudsburg, Wilkesbarre, Carbondale, Scranton and Great Bend.

At Easton, with Lehigh Valley and Lehigh & Susquehanna Railroads for Bethlehem, Allentown, and Mauch Chunk.

S. SCHOCH,
R. A. HENRY, Ass't Superintendent.
Gen. Passenger Agent.
Hoboken, N. J., April 21, 1869.

READING RAILROAD.—GREAT TRUNK

LINE from Philadelphia to the interior of Pennsylvania, the Schuylkill, Susquehanna, Cumberland and Wyoming Valleys, the North, Northwest, and the Canadas.

Summer Arrangement of Passenger Trains, July 12, 1869.

Leaving the Company's Depot, Thirteenth and Callowhill streets, Philadelphia, at the following hours:

MORNING ACCOMMODATION.

At 7.30 A.M. for Reading and all intermediate stations and Allentown. Returning, leave Reading at 6.30 P. M., arrive in Philadelphia 9.15 P.M.

MORNING EXPRESS.

At 8.15 A. M., for Reading, Lebanon, Harrisburg, Pottsville, Pinegrove, Tamaqua, Sunbury, Williamsport, Elmira, Rochester, Niagara Falls, Buffalo, Wilkesbarre, Pittston, York, Carlisle, Chambersburg, Hagerstown, &c.

The 7.30 A. M. train connects at READING with East Pennsylvania Railroad trains for Allentown, &c., and the 8.15 A.M. train connects with the Lebanon Valley train for Harrisburg, &c.; at PORT CLINTON with the Catawissa Railroad trains for Williamsport, Lock Haven, Elmira, &c.; at HARRISBURG with Northern Central, Cumberland Valley, and Schuylkill and Susquehanna trains for Northumberland, Williamsport, York, Chambersburg, Pinegrove, &c.

AFTERNOON EXPRESS

Leaves Philadelphia at 3.30 P.M. for Reading, Pottsville, Harrisburg, &c., connecting with Reading and Columbia Railroad trains for Columbia, &c.

POTTSTOWN ACCOMMODATION

Leaves Pottstown at 6.25 A.M., stopping at intermediate stations; arrives in Philadelphia at 8.40 A. M. Returning, leaves Philadelphia at 4.30 P. M., arriving in Pottstown at 6.40 P.M.

READING ACCOMMODATION

Leaves Reading at 7.30 A.M., stopping at all way stations; arrives in Philadelphia at 10.15 A.M.

Returning, leaves Philadelphia at 5.15 P. M.; arrives in Reading at 8.00 P.M., and connects with Market Train for Pottsville.

Trains for Philadelphia leave Harrisburg at 8.10 A.M. and Pottsville at 8.45 A.M., arriving in Philadelphia at 1.00 P.M. Afternoon trains leave Harrisburg at 2.05 P. M. and Pottsville at 2.45 P.M., arriving at Philadelphia at 6.45 P. M.

HARRISBURG ACCOMMODATION

Leaves Reading at 7.15 A.M. and Harrisburg at 4.10 P.M. Connecting at Reading with Afternoon Accommodation south at 6.30 P.M., arriving in Phildelphia at 9.15 P. M.

MARKET TRAIN, with a passenger car attached, leaves Philadelphia at 12.45 P. M. for Pottsville and all way stations; leaves Pottsville at 5.40 A.M., connecting at Reading with Accommodation Train for Philadelphia and all way stations.

All the above trains run daily, Sundays excepted.

Sunday trains leave Pottsville at 8.00 A.M. and Philadelphia at 3.15 P. M.

Leave Philadelphia for Reading at 8.00 A.M. Returning from Reading at 4.25 P.M.

CHESTER VALLEY RAILROAD.

Passengers for Downingtown and intermediate points take the 7.30 A.M., 12.45 and 4.30 P.M. trains from Philadelphia, returning from Downingtown at 6.10 A.M., 1.00 and 5.45 P.M.

PERKIOMEN RAILROAD.

Passengers for Skippack take 7.30 A.M., 4.30 and 5.15 P.M. trains from Philadelphia; returning from Skippack at 6.15, 8.15, A. M. and 1.00 P. M. Stage lines for various points in Perkiomen Valley connect with trains at Collegeville and Skippack.

NEW YORK EXPRESS, FOR PITTSBURG AND THE WEST.

Leaves New York at 9.00 A. M. and 5.00 and 8.00 P.M., passing Reading at 1.05 A.M., and 1.50 and 10.19 P.M., and connecting at Harrisburg with Pennsylvania and Northern Central Railroad Express Trains for Pittsburg, Chicago, Williamsport, Elmira, Baltimore, &c.

Returning, Express Train leaves Harrisburg on arrival of Pennsylvania Express from Pittsburg at 2.35 and 5.20 A. M., 10.55 P. M. passing Reading at 4.30 and 7.05 A. M. and 12.50 P. M.; and arriving at New York at 11.00 A. M. and 12.20 and 5.00 P. M. Sleeping cars accompany these trains through between Jersey City and Pittsburg without change.

A mail train for New York leaves Harrisburg at 8.10 A.M. and 2.05 P. M. Mail train for Harrisburg leaves New York at 12 noon.

SCHUYLKILL VALLEY RAILROAD.

Trains leave Pottsville at 6.30 and 11.30 A. M. and 6 40 P.M., returning from Tamaqua at 8.35 A. M. and 2.15 and 4.15 P.M.

SCHUYLKILL AND SUSQUEHANNA RAILROAD.

Trains leave Auburn at 6.25 A. M. for Pinegrove and Harrisburg, and at 12.10 P.M. for Pinegrove and Tremont; returning from Harrisburg at 6.20 P. M., and from Tremont at 6.45 A.M. and 7.40 P.M.

CENTRAL RAILROAD OF NEW JERSEY.—Passenger and Freight Depot in New York,

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Three Express Trains to the West, except Sundays, when one train in the evening.

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Silver Palace cars through from New York to Chicago.

SUMMER ARRANGEMENT.

Commencing August 16, 1869.—Leave New York as follows:

6.55 A. M.—For Easton, Bethlehem, Mauch Chunk, Williamsport, Wilkesbarre, Mahanoy City, Tukhannock,

7.15 A. M.—For Somerville.

9.30 A. M.—For Flemington, Junction, Stroudsburg, Water Gap, Scranton, Kingston, Pittston, Great Bend,

9 A. M.—WESTERN EXPRESS.—For Easton, Allentown, Harrisburg and the West, without change of cars to Cincinnati or Chicago, and but one change to St. Louis. Connects at Harrisburg for Erie and the Oil Regions. Connects at Junction for Stroudsburg, Water Gap, Scranton, &c. Connects at Phillipsburg for Mauch Chunk, Wilkesbarre, &c.

12 M.—For Flemington, Easton, Allentown, Mauch Chunk, Wilkesbarre, Reading, Columbia, Lancaster, Ephrata, Litiz, Pottsville, Scranton, Harrisburg, &c.

3.30 P. M.—For Easton, Allentown, Mauch Chunk and Belvidere.

4.30 P. M.—For Somerville.

5.00 P. M.—CINCINNATI EXPRESS.—For Easton, Bethlehem, Allentown, Reading, Harrisburg, Pittsburgh, Chicago and Cincinnati. Sleeping Cars to Pittsburgh and Chicago. Connects at Junction with Delaware, Lackawanna and Western Railroad for all Stations to Scranton.

5.25 P. M.—For Somerville and Flemington.

6 P. M.—For Easton and intermediate stations.

7.00 P. M.—For Somerville.

8.00 P. M.—WESTERN EXPRESS TRAIN.—For Easton, Allentown, Reading, Harrisburg, Pittsburgh and the West—connects at Harrisburg with train for Williamsport, Erie, &c.

8.10 P. M.—EMIGRANT—Stopping only at principal stations.

9.00 P. M.—For Plainfield.

11.45 P. M.—For Plainfield on Wednesdays and Saturdays only.

Sleeping cars through from Jersey City to Pittsburgh every evening.

Trains leave for Elizabeth at 5.45, 6.30, 6.55, 7,15, 8.15, 8.30, 9.00, 9.20, 10.30, 11.40 A. M., 12.00 M., 1.00, 2.00, 3.00, 3.30, 3.45, 4.15, 4.30, 4.45, 5.10, 5.25, 5.45, 6.00, 6.25, 7.00, 7.45, 8.00, 8.10, 9.00, 9.45, 10 45, 11.50 P. M.

Tickets for the West can be obtained at the office of the Central Railroad of New Jersey, foot of Liberty street, N. Y.; at No. 1 Astor House; Nos. 254, 271, 526 Broadway; at No. 10 Greenwich street, and at the principal hotels. R. E. RICKER, Superintendent.

H. P. BALDWIN, Gen. Pass. Agent.

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Summer arrangements, commencing MONDAY, May 10, 1869.

8.00 A. M.—MAIL TRAIN.—Connecting at Denville with Boonton Branch, at Dover with Chester Branch, at Waterloo with the Sussex Railroad for Andover and Newton, at Washington with the D. L. and W. Railroad for Water Gap, Stroudsburg, Scranton, and Great Bend, and all points on the Lackawanna and Bloomsburg, and Delaware and Hudson River Railroad; at Easton with the Lehigh and Susquehanna Railroad for Bethlehem, Allentown, Mauch Chunk, and Wilkesbarre.

11.30 A. M.—LEHIGH VALLEY EXPRESS—Stops at Newark, Morristown, Dover, Hackettstown, Washington, Phillipsburg, and Easton; connects at Phillipsburg with Bel., Del. Railroad for Belvidere, &c., and at Easton with L. V. R. R. for Bethelehem, Allentown, Mauch Chunk, and Wilkesbarre.

4.00 P. M.—SCRANTON EXPRESS—Connects at Washington with the D. L. & W. R. R. for Water Gap, Stroudsburg, and Scranton at Dover with Chester Railroad, and at Waterloo with Sussex Railroad.

6.30 A. M. and 4.30 P. M.—To Summit and intermediate stations.

6.30, 7.30, 9,30 A. M., and 1.00, 3.40, 5.30, 8.45, 11.45 P. M.—To South Orange and intermediate stations.

11.40 A. M., 3.00 and 6.30 P. M.—To Morristown and intermediate stations.

5.10 P. M.—Morristown Express.

For Newark at 6 30, 7.30, 8.00, 8.30, 9.30, 10.30, 11.00, 11.30, 11.40, A. M., 1.00, 2.00, 3.00, 3.30, 3.40, 3.50, 4.00, 4.30, 5.00, 5.10, 6.10, 6.30, 7.45, 8.45, and 11.45 P. M.

For Bloomfield and Montclair—At 8 30, 11.00 A. M.; 2.00, 3.50, 5,00 and 6.10 P. M.

S. SCHOCH, Assistant Superintendent,
R. A. HENRY, G. P. Agent.

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Via Camden, 1 p. m. and 4 p. m.

Via West Philadelphia, 7 a. m., 8.40 a. m., 10 a. m., 12.30 p. m., 5 p. m., *9 p. m., 9.20 p. m., and 12 night.

For Baltimore and Washington—8.40 a. m., 12.30 p. m., *9.26 p. m.

For South and Southwest—8.40 a. m., and *9.20 p. m.

FOR THE WEST.

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*Daily. General Superintendent.

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(foot of Murray-st.,)
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PUBLICATIONS.

THE MINES OF COLORADO:

BY CVANDO J. HOLLISTER.

LATE EDITOR AND PROPRIETOR OF
"THE COLORADO MINING JOURNAL."

The approaching completion of two lines of railway between the Mississippi Valley and the Rocky Mountains, will mark an era in the history of the nearer of the mining Territories—Colorado. It will infuse new life into mining, by giving safe, quick, and reliable communication, reducing freights and risks, thus cheapening supplies and furnishing a most necessary competition in the labor market, under which the production of the precious metals will be largely increased, and the value and importance of property of all kinds will be proportionally enhanced. This cannot fail to arrest the attention of capitalists who are interested in Colorado gold and silver stocks, or are thinking of becoming so. It will be of yet more benefit to that large class whose capital is their muscle, because it will make accessible to them a new and large tract of virgin land, which, though far West, is still on the World's great highway, and therefore in no sense of the word in the backwoods. This region has a pleasant and healthy climate, and while its soil is unsurpassed in strength by that of the prairie States, it has a superior market in the adjoning mines. It most eloquently invites settlement and improvement. It will also give the Summer tourist a choice between the West and the East. It is not hazarding much to say that the Rocky Mountains offer the most delightful Summer resort of the New if not of the Old World. The climate is cool and bracing, the air deliciously pure and soft, the scenery both grand and beautiful, the forests full of game and the streams of trout, with hot mineral springs of high medicinal value boiling up at the root of every shade tree in the sequestered parks. The annexation of the Rocky Mountains to the Union by railways will open a new world to science, a new field of adventure to money and muscle, a new and pleasant place of Summer resort to people of leisure.

To meet the growing want of definite information concerning that interesting country, this book is put forth. It treats of the discovery of gold and settlement of the country, its geography, chorography, geology mineralogy, and agriculture, its early efforts at self government, and the progress and present condition of mining industry, including descriptive list of mining companies, principal improved mines, mills, machinery, and methods of treating ore—in short, it undertakes to give, as concisely and precisely as possible, and without any pretension, all that is known on the subject.

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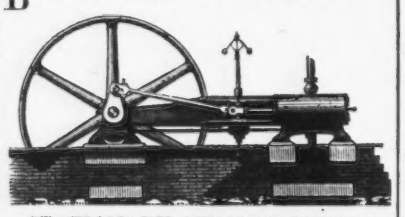

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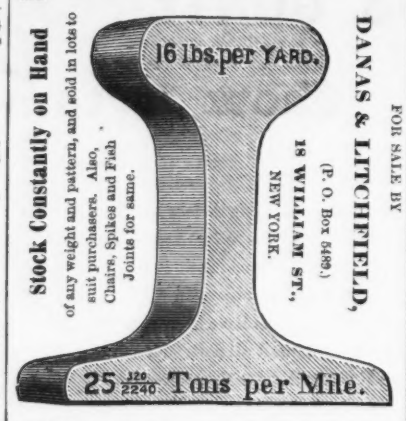

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